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IN THE
Supreme Court of the United States

October Term, 1976

No. A-1031

NATIONAL MICRONETICS INC.,

Petitioner,

v.

U.S. PHILIPS CORP.,
NORTH AMERICAN PHILIPS CORP.,
N. V. PHILIPS GLOEILAMPENFABRIEKEN,

Respondents.

**PETITION FOR WRIT OF CERTIORARI TO
THE UNITED STATES COURT OF APPEALS
FOR THE SECOND CIRCUIT**

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FOR THE SECOND CIRCUIT**
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Petitioner, National Micronetics Inc., prays that a Writ of Certiorari issue to review the judgment of the United States Court of Appeals for the Second Circuit.

Opinions Below

The opinion of the Court of Appeals is reported at 550 F.2d 716, and is reprinted as Appendix A to this Petition. The opinion of the District Court for the Southern District of New York is reported at 410 F.Supp. 449 and is reprinted as Appendix B.

Jurisdiction

The judgment of the Court of Appeals was entered on January 12, 1977. A timely petition for rehearing and suggestion for rehearing *en banc* were denied on March 25, 1977. An application to this Court for an extension of time to file this Petition was granted on June 8, 1977, allowing petitioner until July 23, 1977. The jurisdiction of this Court is invoked under 28 U.S.C. Section 1254(1).

Questions Presented

1. Is the Second Circuit's decision in conflict with this Court's decisions construing the patent clause of the Constitution and Sections 103 and 112 of the Patent Act setting the standards for determining the validity of patents?
2. Did the Second Circuit err in holding that "a combination of existing elements" (550 F.2d 722) constituted a patentable invention where nothing novel was added and no synergistic effect was obtained?
3. Did the Second Circuit err in holding that the patent at issue was not invalid for obviousness (35 U.S.C. 103), despite the conceded absence of any novel conception, on the asserted grounds that it solved a problem, despite the holdings of this Court?
4. Did the Second Circuit err in relying upon the asserted precision obtained by the process where no such claim was made by the patent (35 U.S.C. 112)?

Constitutional and Statutory Provisions Involved

This case involves Art. I, Section 8, Clause 8 of the Constitution (App. C); and Sections 103 and 112 of the Patent Act of 1952, 35 U.S.C. 103, 112 (App. D).

Statement of the Case

A. The Issues Presented

This action for patent infringement and for an injunction and damages was brought on March 2, 1971, by respondent, U.S. Philips Corp., in the United States District Court for the Southern District of New York. Jurisdiction was founded on 28 U.S.C. 1338(a). Petitioner seeks review of the decision of the Court of Appeals for the Second Circuit which, by a 2-1 vote, affirmed the judgment of the District Court holding valid and infringed certain claims of U.S. Patent No. 3,246,383 (hereinafter the Peloschek patent).

The Peloschek patent is directed to the manufacture of magnetic recording heads, particularly for electronic computers. It is a combination of known steps, none of which is novel. The particular factor relied on for patentability—the use of capillary action—is ancient and is known to schoolboy-scientists. (550 F.2d at 724.) The District Court recognized that the validity of the Peloschek patent was far from clear, and that the question of obviousness "is a close one" (A 65a).¹ The majority of the Second Circuit's panel acknowledged that "the elements of the Peloschek patent existed in the prior art of manufac-

1. Reference is to the printed Appendix filed with the Court of Appeals. Statement also appears at 410 F.Supp. at 446.

turing electronic and magnetic devices" (550 F.2d at 723), but rejected petitioner's argument of "obviousness" on the grounds that a particular result achieved, although not specified in the patent's claims, had been "long sought." This standard has been repeatedly and specifically rejected by this Court: *e.g.*, *Paramount-Publix*²; *Dow*³; *Graham*.⁴

The issue which petitioner seeks to present to this Court is limited to the validity of the patent. The decision below is in direct conflict with the unbroken line of decisions of this Court and with other Circuits. It is, however, in keeping with a line of decisions of various panels of the Second Circuit (see cases cited, *infra*, and *cf.*, *Roanwell Corp. v. Plantronics*, 97 S.Ct. 538 (December 6, 1976) (dissent by White and Brennan, JJ., from denial of certiorari to review Second Circuit affirmance of patentability)). The specific issues presented are the constitutional criterion of "invention"; the standards for determining obviousness; the weight to be given to "secondary indicia"; and the legality of deciding the validity of a patent on a basis not stated in the claims.

The Peloschek patent is one of a number of patents relating to the manufacture of magnetic recording heads, used primarily in electronic computers, which are owned by N. V. Philips Gloeilampenfabrieken and affiliates. Each of the Philips patents claims some improvement or change over its predecessors. Each, of course, was intended to and did extend the attempted Philips monopoly for 17 years.

2. *Paramount Publix Corp. v. American Tri-Ergon Corp.*, 55 S.Ct. 449, 453 (1935).

3. *Dow Chemical v. Halliburton*, 65 S.Ct. 647, 651 (1945).

4. *Graham v. John Deere*, 86 S.Ct. 684, 703 (1966).

The Peloschek patent was filed in 1963 and issued in 1966. It would have the effect, if valid, of extending the Philips monopoly until 1983.

Together, IBM and Ferroxcube, a Philips affiliate, manufacture more than 90% of the heads in issue. Micronetics is a relatively small manufacturer of such heads. IBM and Philips have a "field of the Art" agreement under which 1,500 Philips patents are available, including the Peloschek and other Philips patents for magnetic recording heads. The record does not, however, show that IBM is using the Peloschek process. As the Trial Court found, "There is [only] some testimony indicating that IBM made use of the process at least until 1969" (A 68a), and there is no evidence that anyone contracted to pay for use of the Peloschek patent. Accordingly, the Trial Court "has not attached great weight to the proof offered of commercial success" (A 68a). For reasons which are totally obscure, the majority of the Second Circuit's panel disregarded these facts, and relied upon the alleged existence of a problem which Peloschek solved in a "flash of brilliance"!

The Facts

Magnetic recording heads are used in the recording and playback of electronic signals. Familiar examples are instruments for recording voice or music, but the principal use for magnetic recording heads is in electronic computers. The operative part of the head is a core composed of two magnetic pieces separated by a "gap" of minute dimensions which is filled with a non-magnetic material (glass). The core serves electronically to imprint information on magnetic tape, film or disc, which is moved under it.

The only issue in this case relates to the method of filling the "gap" between the two pieces of magnetic material (ferrite) with glass. The glass, in molten or liquid form, serves to bond the magnetic parts of the core.

There is no dispute that all of this including the identical glass-bonded ferrite core was well-known and practiced prior to Peloschek. Magnetic recording is admittedly an old art; the size of the gap is regulated by the insertion of "shims" or spacers, which is concededly prior art in making magnetic recording heads; and filling the "gap" with glass by a variety of alternative means, the glass also serving to "bond" the magnetic pieces, is also well-known art. All of these are taught and disclosed by patents, the major ones (the Duinker patents) being owned by Philips.⁵

The asserted contribution made by Peloschek, relied upon by the Courts below, is to use the ancient principle of "capillary" action to insert the glass in the gap: That is, to locate the glass outside and adjacent to the gap, and then to heat it so that it "flows" into the gap. Alternative methods in use, prior to Peloschek as well as currently, involve inserting the glass or a glass film in the gap or applying a glass coating to the magnetic pieces and then subjecting the core to heat and pressure so that the glass fills the gap and bonds the magnetic pieces.

Peloschek does not claim that he invented the capillary process. Capillary action to fill a minute gap is an old and well-known art. As the dissenting judge in the Court of Appeals stated, the "capillary" procedure is nothing more

5. See 550 F.2d at 725 for citation of specific patents.

than "an adaption of a physical process familiar to every embryonic schoolboy scientist who has watched his blotter absorb ink" (550 F.2d at 724).⁶ Its use in the electronic and magnetic arts is well-established and a number of patents, prior to Peloschek, teach the use of the capillary procedure in those arts for filling minute gaps with a variety of materials. As the Trial Court found: "The prior art indicates the widespread use of capillary action to fill minute gaps * * *." (A 64a).

One of these earlier patents, a German patent, as the Trial Court found, relates specifically to the manufacture of magnetic recording heads (A 60a). The majority below ignores this fact and finding and, without explanation, makes the surprising statement that "capillarity [is] an element previously unused in the art of manufacturing magnetic recording heads." (550 F.2d at 725). Another, the Grant patent, teaches the use of the capillary process in terms that are indistinguishable from the Peloschek claims, or in the words of the Trial Judge, "read most directly on" the Peloschek patent (A 63a). Grant discloses "a structure consisting of two magnetic parts separated by a minute permanent non-magnetic gap, which also bonds the two together, created by flowing non-magnetic material between the two parts by capillary action" (410 F.Supp. at 463). "The function of the claimed invention," according to Grant, "is to connect said magnetizable members together and to form therebetween a permanent non-magnetic gap of *fixed dimensions*." (A 61a). (Emphasis

6. The dissenting judge in the Court of Appeals said:

"The schoolboy scientist, were he willing to spend five minutes on research, would have learned that capillarity works most effectively in narrow spaces." (550 F.2d at 724).

supplied.)⁷ (The majority below discusses Grant at some length, but disposes of it, citing previous Second Circuit decisions,⁸ on the grounds that even if Grant and others demonstrate that capillarity is part of the prior art, the “problem” of achieving precision in the gap-filling process was solved by Peloschek. In fact, there was no such problem; the Peloschek patent, in its 15 claims, does not assert that its contribution is the solution of any such problem; and the decisions of this Court establish that problem-solving, without “invention” does not sustain patentability.)

None of the prior patents or other prior art relating to the use of the capillary process was before the Patent Examiner or cited by him. For this reason, the District Court expressly ruled that the usual statutory presumption of validity of a granted patent was “weakened” (A 52a).

B. Opinions Below

The District Court

The Trial Judge expressed doubts as to obviousness; he found that the evidence of “secondary” indicia of non-obviousness was meager; and he was unimpressed by the “meager” evidence of commercial success. He nevertheless upheld the validity of the Peloschek patent on the basis

7. Grant and the German patent speak of the use of materials other than glass for filling the tiny gaps by capillary action, but this is of no significance: (1) There is no dispute that glass has long been known to be subject to capillary action; (2) only three of the 15 claims of the Peloschek patent specify glass; and (3) it is well-established that relevant prior art includes “closely related arts.” *Graham* at pp. 702-703.

8. 550 F.2d at 722.

of the Second Circuit’s *Timely Products*⁹ opinion which, contrary to this Court’s decisions (see *infra*) asserts that the solution of a problem which others have considered and failed to solve, negates obviousness.

The Trial Judge did not expressly address himself to the question whether the alleged Peloschek contribution to the art satisfied the constitutional requirement for an invention or whether, as the dissent in the Court of Appeals concluded, “His invention did not push back the frontiers of scientific knowledge” (citing this Court’s decision in the *A&P* case).¹⁰ The Trial Judge recognized that prior to Peloschek, there was “widespread use of capillary action to fill minute gaps”; he recognized that prior art, specifically the Duinker Philips patent No. 3,117,367, taught the use of shims or spacers to fix the size of the gap. He admitted that prior art (the Grant patent in particular) used capillary action successfully to fill a gap of “fixed dimensions” (A 61a); he acknowledged that the German patent taught the use of capillarity with specific reference to magnetic recording heads (410 F.Supp. at 463). In his view, however, the Peloschek contribution is patentable because, by the use of capillary action, it achieved a result which other “skilled workers in the field” had not reached: Namely, to insert or inject the glass so as to fill the gap “precisely”. Other facts and findings of the Trial Judge, however, at least cast doubt upon the premise that Peloschek found an answer to a serious problem (even if that premise would support patentability which it does not under the decisions of this Court—see *infra*):

9. *Timely Products Corporation v. Arron*, 523 F.2d 288, 294 (2 Cir. 1975).

10. *Great Atlantic and Pacific Tea Co. v. Supermarket Equipment Corp.*, 71 S.Ct. 127 (1950).

1. Peloschek and his co-worker were not even instructed by Philips to seek a method of more precisely filling the gap. They were asked to find a more economical manufacturing method for gap-filling; and within a few months they came up with the use of the capillary procedure. (As the dissenting judge in the Court of Appeals stated, "There was no crying industrial demand for the process, either prior to the alleged invention or within a reasonable time thereafter" (550 F.2d at 725).)

2. Not a single one of the 15 claims in Peloschek recites or specifies the achievement of greater precision.

3. As the Trial Judge found, after publication of the Peloschek method, there is no evidence of substantial commercial use—if there had been a need which Peloschek satisfied, presumably manufacturers would have turned to the use of his patent and would have taken licenses from Philips.

4. On the contrary, the Trial Court found little use of Peloschek except by Philips itself and petitioner Micronetics, and he concluded that, "In light of the record, the Court has not attached great weight to the proof offered of commercial success."

The Second Circuit

Without acknowledging or even referring to the Trial Court's finding that the German patent had been directed to the use of capillary action in filling gaps in magnetic recording heads, the majority of the Second Circuit panel concluded that "capillarity" was "an element previously unused in the art of manufacturing magnetic recording

heads" (550 F.2d 721). This is clearly erroneous. They, however, held that in the present case, Peloschek "found a solution, however simple, by departing from the norm" of prior practice, to "the industry's search for a process which would accurately reproduce minute gap dimensions [and which] had been the subject of continuing experimentation for nearly a decade" (550 F.2d at 722). On this basis, quoting prior Second Circuit statements in *Timely Products Corporation v. Arron*, 523 F.2d 288, 294 (1975), the majority held that the Peloschek patent was not void for obviousness.

Even if we assume, as the majority says, that Peloschek succeeded where others failed, decisions of this Court, as we have noted, make it plain that this fact would not establish patentability.¹¹ But there is no evidence in this record of a demand, unsatisfied by the prior art, for a process having the characteristics of the Peloschek patent. On the contrary, not a single company agreed to pay the price for a license under the Peloschek patent. As the Trial Court found (A 68a) only Philips and Micronetics use the capillary process. IBM made some use of the process at least until 1969, but this was under a general "field of use" license under which they have available about 1,500 Philips patents. As the Trial Court further found, "the court has not attached great weight to the proof offered of commercial success", and "admittedly the evidence of the 'secondary' indicia of non-obviousness is meager."

The plain fact of the matter is that the decision below secures to N. V. Philips and its affiliates a monopoly of

11. *Anderson's-Black Rock, Inc. v. Pavement Salvage Co., Inc.*, 90 S.Ct. 305 (1969); *Sakraida v. Ag Pro, Inc.*, 96 S.Ct. 1532 (1976).

indeterminable scope and incalculable effect, embracing the use of the old "capillary" process in the art of glass and glass-bonding, based upon a patent which is clearly in violation of this Court's standards.

Reasons for Granting the Writ

A. In Summary

Petitioner respectfully submits that this Court should review the present case:

1. The decision is clearly in conflict with the rulings of this Court with respect to the construction of the patents clause of the Constitution (Art. I, §8, cl. 8); the standards for determining the existence of an "invention" sufficient to sustain the grant of a patent monopoly; and the determination of "obviousness" within Section 103 of the Patent Act.

2. The decision below is in conflict with decisions of other Courts of Appeals on the questions of invention and patentability, obviousness, and the limitation of the patent to its specific claims, for purposes of determining validity. The result is widespread "forum-shopping" in patent cases.

3. The decision below validates a patent on a basis which is not specified or disclosed in the claims or specification of the patent. This decision is in conflict with the conclusions of other Circuits and of this Court, and it opens a potentially explosive area of patent adjudication.

4. The issues are of great importance to the administration of the patent laws and to the national interest in the preservation of an open, competitive society in which access to the fund of knowledge is not interfered with beyond the strict limits of the Constitution as construed by this Court; in which competing entrepreneurs, inventors and innovators are encouraged and are not blocked from the use and development of technical, scientific and production information; and in which competition and innovation generally, and particularly in the high-technology fields, are not constricted by the unwarranted use of monopolies based upon invalid patents.

B. Summary Argument

1. Conflict with Decisions of this Court

a. *Viewed in light of this Court's prior decisions, the Peloschek patent is invalid for lack of invention and for obviousness.*

(1) *Peloschek does not add to the sum of useful knowledge, but seeks to withdraw known processes from public use. It is a combination of prior art. No component or process new to the arts of magnetics or electronics was claimed or disclosed. "No new mental or physical operation" is involved.*¹²

The courts below ignored this Court's repeated admonition that a patent, to be valid, "must add to the sum of useful knowledge, not subtract from it":

12. *Graham*, 86 S.Ct. at 688; *Dow*, 65 S.Ct. at 649.

“Congress may not constitutionally enlarge the patent monopoly without regard to the innovation, advancement or social benefit gained thereby. Moreover, Congress may not authorize the issuance of patents whose effects are to remove existent knowledge from the public domain, or to restrict free access to materials already available. *Innovation, advancement, and things which add to the sum of useful knowledge are inherent requisites in a patent system which by constitutional command must ‘promote the Progress of * * * useful Arts.’ This is the standard expressed in the Constitution, it may not be ignored.*” *Graham v. John Deere*, 86 S.Ct 688. (Emphasis supplied.)

A&P, 71 S.Ct. at 130; *Hotchkiss v. Greenwood*, 11 How. 248 (1851); *Dann v. Johnston*, 96 S.Ct. 1393 (1976); *Dow*, 65 S.Ct. at 649.

(2) *The decisions of this Court establish that the achievement of better results, even if proved, does not sustain a patent in the absence of true “invention”.* “It is elemental that the mere substitution of equivalents which do substantially the same thing in the same way, even though better results may be produced, is not such an invention as will sustain a patent. *Dunbar v. Myers*, 94 U.S. 187, 199, 24 L.Ed. 34; *Smith v. Nichols*, 21 Wall. 112, 119, 22 L.Ed. 566.” *Dow*, 65 S.Ct. at 651. Greater utility does not establish novelty. *Paramount*, 55 S.Ct. at 453-4. “It is relevant to commercial success, not to invention.” *Anderson’s-Black Rock*, 90 S.Ct. at 307. “Greater convenience, cheaper, faster, commercial success prove nothing.” *Sakraida*, 96 S.Ct. at 1537. The asserted improvement does not sustain patentability where it “is the work of a skillful mechanic, not an inventor.” *Sakraida* (1976), quoting *Hotchkiss* (1851); see also *Dow*, 65 S.Ct. 647, 650, “mere

application of an old process to a new and analogous use” is not patentable.

(3) *Combination patents are suspect. As this Court has held, they must meet a “severe test.”* *A&P*, 71 S.Ct. at 130. This Court has at the present term reaffirmed the following basic principle, quoting from *A&P*: “Courts should scrutinize combination patent claims with a care proportioned to the difficulty and improbability of finding invention in an assembly of old elements A patent for a combination which only unites old elements with no change in their respective functions . . . obviously withdraws what already is known into the field of its monopoly and diminishes the resources available to skillful men. . . .”—*Sakraida*, 96 S.Ct. at 1537.

“Strict observance” of the requirements for patentability is essential. *Graham*, 86 S.Ct. at 694.

(4) *At most, the differences between Peloschek and the art in use is not enough to justify the grant of a patent monopoly.* Small differences between the new thing and what we have known before are not enough. *Dann v. Johnston*, 96 S.Ct. 1393 (1976); *Dow*, 65 S.Ct. at 651; *Graham*, 86 S.Ct. at 692 and 703.

(5) *The Peloschek combination does not produce a synergistic result, essential to the validity of combination patents.* *Sakraida*, 96 S.Ct. 1532; *Anderson’s-Black Rock*, 90 S.Ct. 305.

(6) *The basis of the decision in this and other Second Circuit cases—that the patent solved a problem—even if*

that statement were warranted here, does not sustain validity, as this Court has frequently held. The failure of others to come forward with the new use of an old art is not enough. A claim of long-felt need is not enough in the absence of "true invention." *Dow* at 651; *Graham* at 703. Long search for a solution is not enough. *Paramount*, 294 U.S. at 476. The fact that other inventors failed to resort to a method proves nothing; it is "wholly irrelevant". *Graham* at 703. The problem test is "wholly irrelevant". *Graham* at 703. In *Dow*, this Court expressly ruled that the fact that no one thought of the new use is not enough.

"He who is merely the first to utilize the existing fund of public knowledge for new and obvious purposes must be satisfied with whatever fame, personal satisfaction or commercial success he may be able to achieve. Patent monopolies, with all their significant economic and social consequences, are not reserved for those who contribute so insubstantially to that fund of public knowledge." 65 S.Ct. 647. *Dow* at 650.

(7) *The Peloschek process was obvious.* The inventor must be charged with knowledge of the technology. *Dann*, 96 S.Ct. 1393. Relevant prior art includes "closely related art." *Graham*, 86 S.Ct. at 702-703.

b. *The lower court sustained the validity of Peloschek on the basis of its "precise" results—which is not asserted in any of its claims.* A patent may not be validated by features not specified in the claims. 35 U.S.C. 112; *A&P*, 71 S.Ct. 127 at 129; *United Carbon Co. v. Binney & Smith Co.*, 63 S.Ct. 165, 170 (1942). The scope of protection granted by a patent is defined by the language of its claims, and it is the "claims which define the boundaries of a patent

monopoly." *A&P* at 128. It is the claims and only the claims which "measure the invention." *General Electric Co. v. Wabash Co.*, 58 S.Ct. 899, 902 (1938).

Moreover, such an "afterthought" cannot sustain validity; if "precision" of the gap were "so vital an element in the functioning of the apparatus, it is strange that all mention of it was omitted." *Graham*, 86 S.Ct. at 697; quoting *Lincoln Engineering Co. v. Stewart-Warner Corp.*, 303 U.S. 545, 58 S.Ct. 662 (1938); *A&P*, 71 S.Ct. at 129.

2. Conflict with Other Circuits

We respectfully submit that a reading of opinions in other Courts of Appeals involving questions of patentability underscores the need for this Court to review the present case, and to affirm and reaffirm the constitutional and statutory standards which should be applied in all patent adjudications. The present case presents these issues clearly and sharply; and the need is imperative for clear guidance and direction to all circuits as well as to the Second Circuit where the novel and impermissible "existence of a problem" test has been enshrined in disregard of this Court's prior decisions.¹³

For examples of the Second Circuit's departure from this Court's precepts, see *Timely Products Corporation v. Arron*, 523 F.2d 288 (2 Cir. 1975), which gave rise to the "problem" test of patentability in dictum reading: "We can conceive of no better way to determine whether an invention would have been obvious" than to apply the "problem" test. This Court had since the *A&P* case in

13. Even within the Second Circuit, various panels have reached conflicting results.

1950 prescribed the better way, and in *Graham*, in 1966, specifically articulated the primary tests as the better way. The *Timely* opinion was authored by Judge Conner. In the *Roanwell* case, *supra*, criticized by Justices White and Brennan, Judge Conner as the Trial Judge held a patent valid because of the existence of an unsolved problem and relied for authority on his dictum in the *Timely* case (403 F.Supp. 138, 148). The *Roanwell* decision was affirmed per curiam, 535 F.2d 1397, thus converting the "problem" test dictum to the rule of the Circuit. The present case expressly followed the dictum of *Timely* both at the trial and appellate levels in total disregard of the "long standing principles of patent law" mandated by this Court since *Hotchkiss* in 1851; *Roanwell*, 50 L. Ed.2d 619.

Long prior to the dictum in *Timely*, the Second Circuit conspicuously, among all of the federal appellate courts, has based decisions of patent validity upon "secondary considerations" which this Court has repeatedly warned against. See, e.g., *Reiner v. I. Leon Co.*, 285 F.2d 501 (2 Cir. 1960); *Lyon v. Bausch & Lomb Optical Co.*, 224 F.2d 550, 535 (2 Cir. 1955); *Shaw v. E. B. & A. C. Whiting Co.*, 417 F.2d 1097, 1104 (2 Cir. 1969).

Examples of contrary decisions in other circuits are:

1. In the First Circuit, *Eastern Plastics Corp. v. Ronci*, 396 F.2d 890 (1970).
2. In the Third Circuit, *Philips Electronic and Pharmaceutical Industries Corp. v. Thermal and Electronic Industries, Inc.*, 450 F.2d 1164 (1971), involving another Philips affiliate and a patent relating to a glass-to-metal seal. The Third Circuit in that case

faithfully followed the rule of *Graham* and found the patent invalid for obviousness although, like the Peloschek patent, it assertedly solved a long felt need and achieved commercial success.

3. In the Fourth Circuit, *Technograph Printed Circuits, Ltd. v. Martin Marietta Corp.*, 474 F.2d 798 (1972); *Timely Electronics & Systems, Inc. v. Optical Recognitions Systems, Inc.*, 493 F.2d 1222 (1973).
4. In the Fifth Circuit, *Waldon, Inc. v. Alexander Mfg. Co.*, 423 F.2d 91 (1970).
5. In the Sixth Circuit, *Westwood Chemical, Inc. v. Owens-Corning Fiberglass Corp.*, 445 F.2d 911 (1971); *Kaiser Industries Corp. v. McLouth Steel Corp.*, 400 F.2d 36 (1968); *Speakman Company v. Water Saver Faucet Co., Inc.*, 497 F.2d 410 (1974).
6. In the Seventh Circuit, *Panduit Corp. v. Burndy Corp.*, 517 F.2d 535 (1975), involved a strap binding tool which was directed to a combination of elements and assertedly solved a long felt want. The Seventh Circuit reversed the trial court and found the patent invalid on the ground of obviousness. The Court found the patent invalid by strict application of the *Graham* tests.
7. In the Eighth Circuit, *American Infra-Red Radiant Co. v. Lambert Industries*, 360 F.2d 977 (1966); *Hadfield v. Ryan Equipment Co.*, 456 F.2d 1218, 1221 (1972).
8. In the Ninth Circuit, *Proler Steel Corp., Inc. v. Luria Brothers & Co., Inc.*, 417 F.2d 272 (1972);

Ashcroft v. Paper Mate Mfg. Co., 434 F.2d 910 (1970).

9. In the District of Columbia Circuit, *Higley v. Brenner*, 387 F.2d 855 (1967).

We respectfully submit that the Court should put an end to the forum-shopping which these conflicts have invited, and should terminate the situation in which patent validity, access to knowledge, and the survival of competitors to the great patent-engrossers like Philips depends upon Philips choice of forum and the luck of the draw of the panel.

Conclusion

For the reasons stated, a writ of certiorari should issue to review the judgment and opinion of the United States Court of Appeals for the Second Circuit.

Respectfully submitted,

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APPENDICES

Appendix A

UNITED STATES COURT OF APPEALS

SECOND CIRCUIT

U. S. PHILIPS CORP.,
Plaintiff-Appellee,
v.

NATIONAL MICRONETICS INC., *et al.*,
Defendants-Appellants,
v.

NORTH AMERICAN PHILIPS CORPORATION and
N. V. PHILIPS GLOEILAMPENFABRIEKEN,
Counter-Defendants.

No. 209, Docket 76-7134.

Argued Nov. 22, 1976.

Decided Jan. 12, 1977.

Before MANSFIELD, VAN GRAAFEILAND and MESKILL,
Circuit Judges.

MANSFIELD, *Circuit Judge:*

National Micronetics, Inc. ("National") appeals that portion of a judgment of the District Court for the Southern District of New York, Robert J. Ward, *Judge*, holding valid certain claims of U.S. Patent No. 3,246,383 ("the Peloschek Patent"). Appellant does not challenge the district court's additional finding that it infringed the patent.

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The plaintiff, U.S. Philips Corporation, commenced this action against National on March 2, 1971, seeking damages and injunctive relief as assignee of three allegedly infringed patents. National denied infringement, challenged the validity of all three patents, and asserted counterclaims for patent misuse and antitrust violations against plaintiff and its assignors, North American Philips and N.V. Philips Gloeilampenfabrieken. Prior to trial plaintiff withdrew one infringement claim and Judge Ward severed and stayed the counterclaims pending the outcome of the infringement action.

On January 27, 1976, after a trial without a jury, the district court issued a 50-page opinion finding one of the patents invalid and that claims 1-4, 6 and 8-11 of the Peloschek patent were valid and infringed. National's appeal is limited to the issue of the validity of the Peloschek patent under 35 U.S.C. §103, which states that:

"A patent may not be obtained . . . if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains."

The Peloschek Patent

The Peloschek patent's subject matter is a process for the manufacture of a magnetic recording head, which is that part of a tape recorder or computer that translates electrical impulses into magnetic patterns on a tape for the purposes of storage. In reverse, the recording head can

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"read" the magnetic patterns from the tape, meaning that it retranslates them into electrical impulses which then become sounds, pictures, or a computer printout.

A magnetic recording head consists of two basic parts, the first constructed of magnetic material and the second of a non-magnetic material bonded to the first as a "gap" which permits the electrical impulses flowing through the recording head to create magnetized patterns on the tape opposite the gap. The magnetic heads at issue in this case generally have a magnetic portion constructed of two ferrite pieces, bonded together by a non-magnetic portion, usually of a glass-type material. (See Exhibit A hereto). The process for which the Peloschek patent was obtained describes a method of bonding the two ferrite pieces and the gap material to create a single-piece magnetic head with a minute non-magnetic gap.

The recording head and the gap in it must be of near-microscopic dimensions in order to maximize the amount of information which can be stored on a given portion of tape. The gap, which determines the size of the magnetized spot on the tape, generally measures no more than 50 to 100 microinches or millionths of an inch. (An average sheet of paper is about 3,000 microinches thick.) The evidence shows that for a given recording head to be able accurately to read or retranslate information which has originally been stored on a tape through use of a different recording head, the gap dimensions in each head must be virtually identical, with allowable deviations or tolerances of no more than 10 to 20 millionths of an inch for the larger heads, and much less in smaller recording heads. Since numerous re-

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cording heads are used in a single computer disc file, it is of vital importance to have all heads conform to prescribed gap dimensions within a few millionths of an inch. Otherwise some of the essential recording heads will not function as the system requires.

For nearly a decade prior to the issuance of the Peloschek patent the recorder-manufacturing industry was concerned over the inability to produce glass-bonded heads which would uniformly meet the precise specifications and conform to the narrow tolerances that were essential to successful performance and interchangeability. The Peloschek patent addresses itself to this problem. Filed May 3, 1963, and issued April 19, 1966, the patent states its objective as follows:

"Magnetic heads with very short gaps having lengths between 1 and 20 microns are difficult to manufacture since close tolerances are usually imposed on the length of the gap and the non-magnetic material in the gap must have a good resistance to detrition and must be capable of being readily processed; in addition, the process of manufacture should be as economical and simple as possible. The gap material also must be as homogeneous as possible. *It is the primary object of the invention to provide a method of manufacturing magnetic heads with very short gap lengths which is comparatively simple to perform while achieving close tolerances for gap length.*" (Emphasis added).

The claims which were sustained by the district court are:

"1. A method of manufacturing portions of magnetic heads composed of two magnetic circuit parts consisting of sintered oxidic ferromagnetic material

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and having confronting gap surfaces with a gap therebetween filled with a nonmagnetic material bonding the circuit parts together, comprising: placing spacing members having a thickness equal to the desired gap length at opposite ends of a first polished gap surface of one circuit part, placing a corresponding polished gap surface of a second circuit part on said spacing members in confronting relationship with said first surface thereby forming a gap between said surfaces, placing a quantity of nonmagnetic material adjacent to the gap, said nonmagnetic material having a melting temperature below that of said ferromagnetic material, and heating the resulting assembly to the melting temperature of said nonmagnetic material, whereby said nonmagnetic material melts, fills the gap by capillary action, and bonds the circuit parts together.

"2. A method according to claim 1, wherein said nonmagnetic material is glass.

"3. A method according to claim 1, wherein said magnetic material is enamel.

"4. A method according to claim 1, wherein pressure is applied to the assembly during the heating step."

Claims 6 and 8 describe the use of the process in making a multiple of recording heads, and claims 10-11 omit the use of spacing members in the process.

The claimed manufacturing process for the bonding of the magnetic and nonmagnetic portions of the recording heads may be summarized as: (1) presetting the gap or space between two ferrite pieces at a desired length by placing the surfaces of the ferrite pieces opposite each other, inserting spacing members or shims of precise given

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dimensions between them, and bringing the ferrite surfaces firmly together against the spacers or shims, which serve to fix the gap length at a predetermined distance; (2) placing the nonmagnetic material (e. g., glass) adjacent to the space between the ferrite pieces; (3) heating the assembly to the melting point of the nonmagnetic material (glass); and (4) permitting the melted nonmagnetic material (glass) to flow into and fill up the gap, with the result that the two ferrite pieces are bonded together by nonmagnetic material of a predetermined thickness. The flowing action is created by capillarity, a principle of physics which is defined by Webster's New Collegiate Dictionary (7th ed.) as "The action by which the surface of a liquid where it is in contact with a solid is elevated or depressed depending on the relative attraction of the molecules of the liquid for each other and for those of the solid."

The district court, in a well-reasoned decision, held that the subject matter of the Peloschek patent would not have been obvious to one skilled in the art of glass bonding at the time it was made, observing

"The crucial feature . . . is the use of capillary action to fill a preset gap of precise, reproducible dimensions. Nowhere in the prior art . . . is there any disclosure which would make it clear to one skilled in the art that such an application of capillary action would be successful."

The district court refused to accord weight to National's showing that capillary action had been disclosed in patents in the electronics and recording industry. "The prior art indicates the widespread use of capillary action to fill min-

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ute gaps, but in none is the precise size of the gap of great importance or predetermined."

Appellant claims that the capillary process was "obvious" under 28 U.S.C. §103 and that the district court erred in inferring from the evidence that the Peloschek patent claimed a level of gap precision and uniformity greater than that found in the prior art. We disagree, and affirm the district court's finding of validity.

Scope of Review

To resolve the issue whether the invention was obvious within the meaning of 35 U.S.C. §103, we must examine the scope and content of the prior art, the differences between the prior art and the claims at issue, and the level of ordinary skill in the pertinent art. *Graham v. John Deere Co.*, 383 U.S. 1, 17, 86 S.Ct. 684, 15 L.Ed.2d 545 (1966).¹ In doing so, we recognize that the ultimate issue of the validity of a patent is a question of law, and that the district court's findings of fact will not be disturbed unless clearly erroneous, except that where they are based on undisputed facts or documentary evidence, we may substitute our own inferences and conclusions for those of the district judge. *Maclaren v. B-I-W Group, Inc.*, 535 F.2d 1367, 1371 (2d Cir.), *petition for cert. filed*, — U.S. —, 97 S.Ct. 531, 50 L.Ed.2d — (1976).

1. The Supreme Court also made it clear in *Graham* that long-felt need in the industry and commercial success may also be considered, 383 U.S. at 35-36, 86 S.Ct. 684, although these "criteria are of secondary importance," see *Julic Research Laboratories, Inc. v. Guideline Inst. Inc.*, 501 F.2d 1131, 1135 (2d Cir. 1974).

*Appendix A**The Prior Art*

Prior art processes for the manufacture of magnetic recording heads were aimed principally at the discovery or development of a manufacturing process which would produce uniformity in the non-magnetic gap lengths within the tolerances or permitted ranges of deviation that are essential to the proper functioning of recording heads. Another aim was to insure that the non-magnetic material used to fill the gap would not suffer from irregularities, such as bubbles or other defects that would impair the magnetic effectiveness of the ferrite pieces or core. The prior art history, as disclosed in a series of patents issued during the period 1954 to 1962, is one of repeated efforts to solve these problems, which were for the most part unsuccessful. Although some improvements were achieved in the quality of the recording heads produced, the processes generally resulted in low yields of acceptable heads, ranging from 5% to 50%.

The earliest of the patents for manufacture of magnetic recording heads introduced at trial was No. 2,919,312, issued to Georg Rosenberger, et al., on December 29, 1959, on an application filed March 16, 1954. It claimed a process of manufacturing such heads with a "limited and well defined very narrow working gap," through the cementing of non-magnetic filler material between the ferrite pieces. In 1956, seven years prior to the filing of the Peloschek patent, Simon Duinker and Jules Bos filed a patent application entitled "Glass Gap Spacer for Magnetic Heads." This application, for which patent No. 3,024,318 (Duinker '318) was issued in 1962, accurately disclosed the state of the art

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of manufacturing magnetic recording heads at the time. The patent substituted a glass foil material in place of other gap materials. In discussing "the requirements to be satisfied by the width of the gap,"² the application stated that "in the present state of the art with respect to magnetic recordings, these requirements have become comparatively exacting and the disadvantages attendant on the use of such [foil spacing plates] during manufacture are becoming increasingly marked." Duinker '318, by its own terms, sought to achieve the "correct gap width" by placing a thin glass foil between the ferrite surfaces, heating the assembly, and applying pressure to bond the ferrite and the glass, forming the gap. This process became known colloquially as the "sandwich" technique, as distinguished from Rosenberger, which simply used cement.

In patent No. 3,094,772 (Duinker '772), entitled "Method of Producing Magnetic Heads with Accurately Predetermined Gap Heights," Duinker once again sought to attain a "well-defined" gap through revision of the technique employed in '318. He criticized the prior art on the grounds that "the gap height . . . cannot be determined within narrow limits" and stated "[i]t is also difficult if not impossible to produce small gap widths." Essentially Duinker '772 claimed that it improved the accuracy of the gap lengths through use of more accurately placed and finished ferrite pieces.

2. In the various reports and patent applications, the term "gap width," "gap length," and "gap dimensions" are used interchangeably to describe the measurement of the distance between the two ferrite (magnetic material) pieces, which is filled with a glass bonding material (non-magnetic).

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In 1963 patent No. 3,079,470, for which application had been made in 1959, was issued to Marvin Camras of the Armour Research Foundation of the Illinois Institute of Technology. The object of this process, as with its predecessors, was to construct a magnetic recording head having "a very precise stable gap structure capable of maintaining precise gap dimensions." This time, the inventor introduced a low melting point gap material and proposed the use of an "evaporated film" as a preliminary gap spacer in the process. The bonding procedure under this patent continued to employ a sandwich-like pressure of the heated gap materials to the ferrite.

In 1959 Duinker, still trying to find a way of solving the problem of producing uniform gaps of non-magnetic material, applied for a patent which further refined but failed to depart from the sandwich technique. Duinker now proposed to add "shims" or spacers made of mica to help attain a "correct gap length." In discussing the disadvantages of the prior art, the application, for which patent No. 3,117,367 was issued on January 14, 1964, stated that "the adjustment of the gap length to the correct value is not possible when the glass flows away."³ However, the spacers were largely ineffective in achieving their objective because the glass foil inserted between the faces of the ferrite pieces was thicker than the shims so that when heat and pressure were applied, the gap length was sometimes

3. Duinker's objective of finding a process for achieving accurate gap dimensions is further evidenced by a report he authored shortly after applying for Duinker '367. In "Durable High-Resolution Ferrite Transducer Heads Employing Bonding Glass Spacers," he stated that for extremely small gap lengths "mica spacers are necessary to ensure predetermined values."

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altered by the presence of glass between the ferrite and the spacers or by the movement of the spacers.

A patent issued to Robert Pfof of the Ampex Corporation on November 8, 1966, on an application filed April 17, 1961, sought a process for the manufacture of "ferrite core heads having accurate gap dimensions." It described the prior art techniques as "tedious, time-consuming, and uneconomical because [the heads] must be manufactured individually to provide proper gap dimensions." The claimed process in this patent consisted essentially of placing spacer strips on one of the ferrite surfaces, a layer of glass on the other surface, and joining them together under high temperature and pressure.

Finally, in an application filed in July, 1962, less than a year prior to the filing of the Peloschek patent, James S. Hanson, an employee of I.B.M., claimed the invention of a process capable of producing a "more predictable gap," and "permitting manufacture of gaps which are uniform throughout the entire dimension thereof." Hanson's patent, No. 3,217,305, sought to improve the distribution of the glass bonding material within the gap by employing grooves in the ferrite surface. His basic process, like those of his predecessors, was the sandwich technique.

Thus the picture of the art of manufacturing magnetic recording heads prior to Peloschek is one in which, although there were some advancements, each of the processes immediately preceding Peloschek employed variations on a method which bonded the magnetic and non-magnetic materials through the use of heat and application of pressure in a sandwich configuration, with several of the methods using

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spacers and shims in an effort to set the desired gap size. Each patent criticized the prior art as unable to attain the reproducibility of uniformly accurate gap dimensions. None of these prior art processes, moreover, was able uniformly to meet the stringent gap-length tolerances required by manufacturers of magnetic recording heads. Due to the higher pressures used in the sandwich method the ferrite gap surfaces moved toward one another, resulting in variations in the gap. Although spacers or shims were used in an effort to hold the ferrite faces apart, the spacers could not uniformly control the gap length because the glass foil inserted between the ferrite faces was thicker than the spacers and the pressure applied to the ferrite pieces varied. As a result, viscous glass would sometimes enter between the spacers and the ferrite pieces or the spacers would move outward rather than remain in place, causing unacceptable variations in the gap length.

The Peloschek patent differs significantly from these prior art processes used to manufacture recording heads. First, the Peloschek patent places the glass bonding material *outside* of the pre-set gap rather than between the pieces of ferrite. Second, it departs from the use of pressure to accomplish bonding⁴ and relies instead upon the force of capillarity, an element previously unused in the art of manufacturing magnetic recording heads. Additionally, undisputed testimony by plaintiff's expert witness and by the co-inventor of the Peloschek process established

4. The only pressure used by Peloschek is slight pressure designed solely to hold the spacers in place as distinguished from the high pressure used by prior art process to bond the glass to the ferrite faces. In Peloschek the bonding is achieved exclusively by capillarity.

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that, for the first time, yields of 90% accurate gap dimensions were obtained in an economically feasible production process, as compared to only 5% to 50% under prior art processes.

As might be expected of one challenging the validity of a patent on grounds of obviousness under §103, National seeks to broaden the scope of the prior art beyond processes for the manufacture of recording heads to those using the principle of capillarity for other manufacturing purposes, such as to cause molten metal or liquid epoxy cement to flow into random irregular spaces or into voids between metal parts held in contact with one another. National contends that these processes show that the use of capillarity was predictable and obvious to one ordinarily skilled in the art of manufacturing recording heads.

Whether these latter processes, which do not involve use of glass or ferrite and are not aimed at creating minute non-magnetic gaps of precise, predetermined size, are pertinent prior art for present purposes is extremely doubtful. However, we need not resolve that issue for the reason that even if these processes are considered to be prior art, the proof is overwhelming that they do not suggest to one ordinarily skilled in the development of processes for the manufacture of magnetic recording heads that capillarity might be used in combination with existing processes as a means of producing very minute gap dimensions within the narrow tolerances demanded by the trade. The patent issued to Grant (No. 2,500,748), for instance, is heavily relied on by National because it claims the use of capillary action to form non-magnetic gaps in a magnetic structure. Despite

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the superficial similarity of Grant to Peloschek, however, the differences between the two patents make it readily apparent that the capillarity concept would not have been apparent to one searching for a means of filling a pre-set gap of precise, very minute, dimensions.

Grant was merely concerned with filling random metal voids with epoxy or metal, not with near-microscopic manufacture of exactly reproducible gap lengths of fixed dimensions, with only a few millionths of an inch variance. Indeed, in Grant there is no such thing as pre-fixed spacing or an effort to create a predetermined gap, much less one of specific dimensions. Moreover, the prior art (Zinke, "Technologie der Glas Verschurelzungen") taught that molten glass was unsuitable for capillary action because it tended to remain at the area of application and not to flow into narrow interstices. The apparent inappropriateness of capillary action as a means of solving the problem faced by Peloschek and his predecessors is further evidenced by the fact that, although Grant was issued in 1947, and numerous persons skilled in the art of recording head manufacture, including Duinker, had sought over a period of more than ten years to solve the problem of creating reproducible minute non-magnetic gaps of precise predetermined size, there is no evidence that any attempt was made to use capillarity.

DISCUSSION

As we recently said in *Timely Products Corporation v. Arron*, 523 F.2d 288, 294 (2d Cir. 1975):

"We can conceive of no better way to determine whether an invention would have been obvious to per-

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sons of ordinary skill in the art at the time than to see what such persons actually did or failed to do when they were confronted with the problem in the course of their work. If the evidence shows that a number of skilled technicians actually attempted, over a substantial period, to solve the specific problem which the invention overcame and failed to do so, notwithstanding the availability of all the necessary materials, it is difficult to see how a court could conclude that the invention was 'obvious' to such persons at the time."

In *Timely Products* we found that "no such evidence exists." Here, in contrast, the evidence clearly demonstrates that the industry's search for a process which would accurately reproduce minute gap dimensions had been the subject of continuing experimentation for nearly a decade, and that the object was successfully accomplished only when Peloschek abandoned the sandwich techniques in favor of the use of capillarity. Moreover, in contrast to *Maclaren v. B-I-W Group, Inc.*, *supra*, this innovation was not foreshadowed by any of the preceding patents for the manufacture of recording heads.

Accordingly, we conclude that the Peloschek patent is significantly different from the prior art and represents a distinct advancement in the level of skill in the art. The district court's conclusion that the Peloschek claims were not obvious is therefore correct. Moreover, it is consistent with the terms of 35 U.S.C. §103 and the cases interpreting its provisions. Even assuming that patents disclosing capillary action, such as Grant, were deemed part of the pertinent prior art, so that the Peloschek patent would represent

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a combination of existing elements rather than a pure innovation,⁵ the invention would still satisfy the "rigorous" standards of §103. *Lemelson v. Topper Corp.*, 450 F.2d 845, 848 (2d Cir. 1971); *Maclaren v. B-I-W Group, Inc.*, *supra*.

The existence of an important problem in the art which has remained unsolved for a long period, despite continued efforts and a series of refinements of the art, until a new combination of concepts produces a solution, is evidence that the combination was not obvious. *Shaw v. E. B. & A. C. Whiting Co.*, 417 F.2d 1097, 1104 (2d Cir. 1969), *cert. denied*, 397 U.S. 1076, 90 S.Ct. 1518, 25 L.Ed.2d 811 (1970). This case falls under the rule that

"[i]f those skilled in the art are working in a given field and have failed after repeated efforts to discover a particular new and useful improvement, the person who first makes the discovery does more than make the obvious improvement which would suggest itself to a mechanic skilled in the art, and is entitled to protection as an inventor." *McCullough Tool v. Well Surveys, Inc.*, 343 F.2d 381, 399 (10th Cir. 1965), *cert. denied*, 383 U.S. 933, 86 S.Ct. 1061, 15 L.Ed.2d 851 (1966).

See also *A. E. Staley Manufacturing Co. v. Harvest Brand, Inc.*, 452 F.2d 735, 738 (10th Cir. 1971), *cert. denied*, 406 U.S. 974, 92 S.Ct. 2415, 32 L.Ed.2d 674 (1972).

The cases upon which appellant relies are clearly distinguishable. In *Anderson's Black Rock, Inc. v. Pavement Salvage Co., Inc.*, 396 U.S. 57, 60, 90 S.Ct. 305, 24 L.Ed.2d

5. In *Reiner v. I. Leon Co.*, 285 F.2d 501, 503 (2d Cir. 1960), Learned Hand wrote that, "It is idle to say that combinations of old elements cannot be inventions; substantially every invention is for such a 'combination': that is to say, it consists of former elements in a new assemblage."

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258 (1969), the Supreme Court rejected a combination of old elements to solve a problem in "blacktop" paving processes on the grounds that the combination was "not critical or essential" to curing the problem and did not produce a "new or different function." The Court rested its recent decision in *Sakraida v. Ag Pro, Inc.*, 425 U.S. 273, 96 S.Ct. 1532, 47 L.Ed.2d 784 (1976), on this same finding with respect to a barn-cleaning combination patent. In contrast to those cases, the evidence in the present case is un rebutted that the Peloschek patent produced a result unobtainable with the prior processes. For the first time a process functioned to produce high yields of accurate gap dimensions, curing a problem in the art.

In *Dann v. Johnston*, 425 U.S. 219, 96 S.Ct. 1393, 47 L.Ed.2d 692 (1976), the Court found that the gap between the prior art and the claimed invention in systems used to record a breakdown of banking customers' transactions by the nature of the transaction was not great enough to justify patentability of the respondent's system because it failed to meet the non-obviousness standard. There, all systems sorted out the transactions, albeit by slightly different methods. In the present case, on the other hand, the gap between the prior art and the Peloschek patent is enormous—the difference between success and failure. In lieu of an unsuccessful re-refinement of an existing process, Peloschek reveals a flash of brilliance which found a solution, however simple, by departing from the norm. It is this type of advancement that has traditionally been rewarded with patent rights, and to deny those rights here

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might unjustifiably deter industry members from seeking to invest, innovate and experiment.⁶

In its most favorable light, National's evidence merely shows that the elements of the Peloschek patent existed in the prior art of manufacturing electronic and magnetic devices. We have consistently held that such a showing alone is inadequate to demonstrate obviousness when the combination of those pre-existing elements results in novel, unanticipated or long-sought results. See *Koppers Co., Inc., v. S & S Corrugated Paper Machinery Co., Inc.*, 517 F.2d 1182, 1188 (2d Cir. 1975); *Carter-Wallace v. Otte*, 474 F.2d 529, 539-40 (2d Cir. 1972), *cert. denied*, 412 U.S. 929, 93 S.Ct. 2753, 37 L.Ed.2d 156 (1973); *Reiner v. I. Leon Co.*, 285 F.2d 501, 503 (2d Cir. 1960).

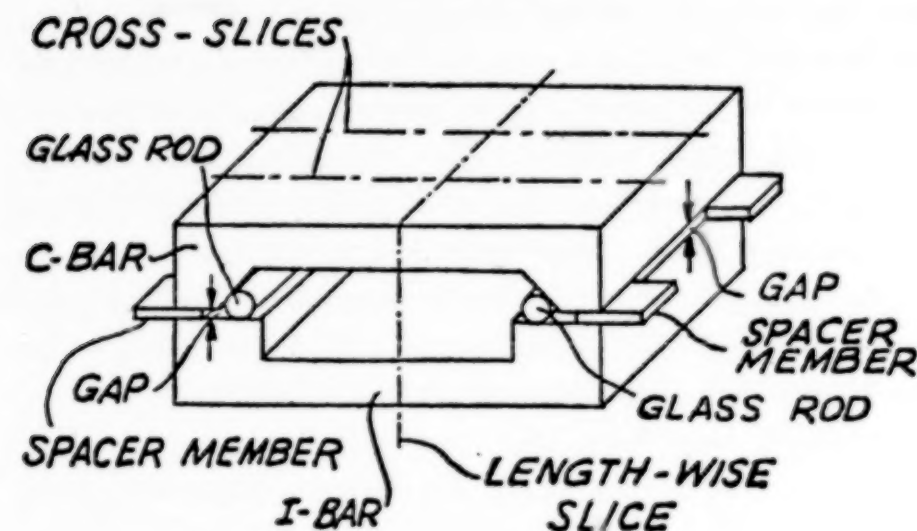
The judgment of the district court is therefore affirmed.

6. Defendant's reliance on *Dow v. Halliburton*, 324 U.S. 320, 65 S.Ct. 647, 89 L.Ed. 973 (1944), a case predating the 1952 revision of §103, is similarly misplaced. In that case the Supreme Court rejected a patent which claimed protection of the addition of an inhibiting agent to acid used in a previously known process for disintegrating limestone in order to attain more crude oil in drilling operations while protecting the metal pipes from corrosion. The Court upheld the lower court finding of invalidity because both the acid process and the use of an inhibiting agent in cleaning the pipes were already in use in the industry. The Court stated that the fact that inhibitors had not been previously used in the process for drilling was inadequate, "Especially . . . since there is no evidence of anyone trying unsuccessfully to inhibit hydrochloric acid for such purposes." In the present case the evidence is overwhelming that the industry had been consistently trying to gain precisely predetermined gaps without success.

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EXHIBIT A

DRAWING OF PARTS OF
PELOSCHKE MAGNETIC RECORDING HEAD,
SHOWN IN BLOCK FORM,
BEFORE BONDING AND SLICING



VAN GRAAFEILAND, Circuit Judge, dissenting:

Reduced to its bare bones, the "invention", for which appellees have been granted a 17-year monopoly, consists of filling a narrow space between two pieces of metal with a melted non-magnetic material such as glass through capillary action. The majority say this was conceived in a "flash of brilliance". I find it to be simply an adaptation of a physical process familiar to every embryonic schoolboy scientist who has watched his blotter absorb ink.¹ At the very least, I agree with the District Court's finding that

1. The schoolboy scientist, were he willing to spend five minutes on research, would have learned that capillarity works most effectively in narrow spaces. See, e.g., J. Bikerman, *Surface Chemistry* 361 (1958).

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"the prior art indicates the widespread use of capillary action to fill minute gaps."²

The importance which my colleagues attach to the fact that the gap in this case is preset escapes me completely. Every gap between two intentionally placed objects is preset. The use of shims to determine the width of the setting was less than novel and was clearly part of the prior art.³

Of course, for capillarity to operate, the liquid involved must be of a type which "wets" the material which surrounds it, in order that the molecules of the liquid cling together on the face of the material and pull the liquid with it. However, the prior art clearly showed that molten glass "wets" ferrite,⁴ so that capillary action was an obvious and expected result of a combination of the two.⁵

2. Earlier patents disclosing the use of capillarity included German patent No. 10546, used in manufacturing magnetic recording heads, the Grant patent, No. 2,500,748, the DeJean patent, No. 3,304,358, the Feinberg patent, No. 3,341,939 in the magnetics field and the Reichenbaum patent, No. 3,029,505, in the electronics field. "[A] patent claiming a device that has already been put to use, albeit in a different manner, is invalid; in order to be valid over the prior art, it must claim not novel use, but novel conception." *Beckman Instruments, Inc. v. Chemtronics, Inc.*, 439 F.2d 1369, 1375 (5th Cir.), cert. denied, 400 U.S. 956, 91 S.Ct. 353, 27 L.Ed.2d 264 (1970).

3. Duinker, No. 3,117,367.

4. Duinker, No. 3,094,772 and Pfoest No. 3,283,396.

5. Despite the majority's reference to Zinke, as authoritative prior art, one hour's research in the library would have taught the inventors that, at a temperature of 1,000 degrees, the differences in the mobilities of different glasses are very large, see J. Bikerman, *supra*, note 1, at 152, and that, although glass is a "slow motion" liquid, it has flow properties on an extended time scale similar to those of ordinary liquids. See G. Jones, *Glass* 8 (1956). Moreover, the Hill patent, No. 3,065,571, filed for in 1957, clearly utilized the capillarity of molten glass in the manufacture of electrical discharge devices and electrical contacts. In any event, respondent's patent does not limit its claims to molten glass, claim No. 1 specifying simply the use of a "non-magnetic material".

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I do not read the record below to indicate that the capillary process was the culmination of years of research aimed at solving a pressing problem. There was no crying industrial demand for the process, either prior to the alleged invention or within a reasonable time thereafter. As the District Court stated, secondary indicia of nonobviousness were meager. Proof that, between 1954 and 1969, four patent applications were filed for the manufacture of magnetic heads to be used in the infant field of tape recorders and computers falls far short of establishing the decade of "continuing experimentation" which my brothers say took place and does not give rise to the inference of invention. *Paramount Publix Corp. v. American Tri-Ergon Corp.*, 294 U.S. 464, 476, 55 S.Ct. 449, 79 L.Ed. 997 (1935). Even assuming the existence of a long-felt want and the failure of others to meet that want, this is relevant only as a secondary test for obviousness and does not create patentability where invention is lacking. *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 61, 90 S.Ct. 305, 24 L.Ed.2d 258 (1969); *Hadfield v. Ryan Equipment Co.*, 456 F.2d 1218, 1221 (8th Cir. 1972). According to the testimony of Matthijs Vrolijk, one of the inventors, a committee was formed in 1960 or 1961 at N.V. Philips to "optimize" the Duinker procedure by improving its productive yield. Within a matter of months, this result was achieved by using the well-recognized capillary process.

In applying the §103 test for obviousness, one should picture the inventors working in their shop with the prior art references hanging on the walls around them. *Esso Research & Engineering Co. v. Kahn & Co.*, 379 F.Supp.

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205, 211 (D. Conn. 1974), *aff'd per curiam on the opinion below*, 513 F.2d 1341 (2d Cir. 1975). On the wall directly before them would be inscribed the long-known and well-understood physical principles of capillarity which, like Boyle's Law and Dalton's Law in *Esso Research, supra*, the inventors must be regarded as knowing. On the walls to their left would be the patents utilizing the capillary fill process, including German patent, No. 10546, used in manufacturing magnetic recording heads, the Grant patent, No. 2,500,748,⁶ the DeJean patent, No. 3,304,358, the Feinberg patent, No. 3,341,939 in the closely related magnetics field and the Reichenbaum patent, No. 3,029,505 in the electronics field. Also on that wall would be the readily available learning concerning the flowing properties of molten glass, the Duinker patent, No. 3,094,772, and the Pfof patent, No. 3,283,396, showing that molten glass will wet ferrite, and the Hill patent, No. 3,065,571 showing the use of capillarity for the insertion of molten glass in the gaps of electrical discharge devices. On their right would be the Duinker patent, No. 3,117,367, showing the use of shims or spacers to preset the gap into which capillarity would draw the molten glass.

A glance around the room would disclose "all the elements of [Vrolijk's] device, both individually and in combination". *Esso Research & Engineering Co. v. Kahn & Co., supra*, 513 F.2d at 1341. His invention did not push back the frontiers of scientific knowledge, *Great Atlantic &*

6. The District Court described Grant in the following language:

In plain English, the patent discloses a structure consisting of two magnetic parts separated by a minute permanent non-magnetic gap, which also bonds the two together, created by flowing non-magnetic material between the two parts by capillary action.

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Pacific Tea Co. v. Supermarket Equipment Corp., 340 U.S. 147, 154-55, 71 S.Ct. 127, 95 L.Ed. 162 (1950) (Douglas, J., concurring), but merely utilized the existing fund of public knowledge for a new and obvious purpose. *Dow Chemical Co. v. Halliburton Oil Well Cementing Co.*, 324 U.S. 320, 326-28, 65 S.Ct. 647, 89 L.Ed. 973 (1945). I believe that the private monopoly granted herein is "at odds with the inherent free nature of disclosed ideas" and has been too freely given. *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 9, 86 S.Ct. 684, 689, 15 L.Ed.2d 545 (1966).

I would reverse.

Appendix B

UNITED STATES DISTRICT COURT
S. D. NEW YORK

U. S. PHILIPS CORPORATION,

Plaintiff,

v.

NATIONAL MICRONETICS, INC., and
NED W. BUOYMASTER,

Defendants,

v.

NORTH AMERICAN PHILIPS CORPORATION, and
N. V. PHILIPS GLOEILAMPENFABRIEKEN,
Counter-Defendants.

No. 71 Civ. 921.

Jan. 27, 1976.

OPINION

WARD, *District Judge.*

This is an action alleging infringement of U. S. Patent No. 3,024,318 to Duinker et al. for a "Glass Gap Spacer for Magnetic Heads" (hereinafter the "Duinker patent") and U. S. Patent No. 3,246,383 to Peloschek et al. for a "Method of Manufacturing Magnetic Heads with Bonding Gap—

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Filling Materials" (hereinafter the "Peloschek patent"). For the reasons hereinafter stated, the Court holds the Duinker patent invalid and the Peloschek patent valid and infringed.

I. *The Parties, Jurisdiction and Venue*

Plaintiff U. S. Philips Corporation (hereinafter "Philips") is a Delaware corporation with its principal place of business in New York City whose primary business is licensing patents. It owns the rights to the two patents in suit through assignment from N. V. Philips Gloeilampenfabrieken (hereinafter "N.V. Philips"), whose employees developed the inventions which are the subject of the patents.

Defendant National Micronetics Inc. (hereinafter "Micronetics") is a New York corporation with its principal place of business at West Hurley, New York. It is in the business of manufacturing glass bonded ferrite cores for use in magnetic recording heads. Defendant Ned W. Buoymaster is one of the founders and President of Micronetics. He resides in Woodstock, New York.

This Court has jurisdiction of the parties and the subject matter of this action and venue is properly laid in this district.

II. *The Pleadings*

The complaint filed on March 2, 1971 originally charged defendants with infringement of three patents owned by plaintiff. Prior to trial, plaintiff withdrew the infringement claim relating to one of these patents. As to the infringement of the two remaining patents, plaintiff seeks a

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declaratory judgment, an injunction and damages. The defendants, by their answer, deny infringement and challenge the validity of both patents on the grounds of obviousness and indefiniteness. In addition, defendants have counterclaimed against plaintiff and additional defendants on the counterclaim, N. V. Philips and North American Philips Corporation, for patent misuse and violation of the antitrust laws. The counterclaims were severed and stayed pending the outcome of the patent infringement action which was tried to the Court.

III. Background

Magnetic recording heads are devices used to record ("write") signals representing sound or information on a moving magnetic medium such as a tape, belt, or disc or to pick up ("read") such recorded signals. A magnetic recording head consists of a nearly closed ring of magnetic material with a minute non-magnetic gap around which ring a coil of wire is wrapped. The ring and gap structure comprise the core of the head which is the focus of this litigation. An electric current, when passed through the head, will create a small magnetized spot on the magnetic medium opposite the gap. This spot represents the recorded information. As the medium moves, successive, discrete spots will be magnetized. The smaller the spots and the closer they are spaced, the more information can be stored in the least amount of magnetic medium. This may be referred to as "high resolution" or "high bit density." The achievement of increasingly higher resolution or bit density depends to a great extent on various qualities of the recording head, including the size of the gap and the ma-

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terial of which the head is made. The shorter the gap, the smaller the magnetized spot. Ideally, the head material has low electrical conductivity to minimize the losses; that is, the least amount of electrical current introduced into the head will be lost to the generation of heat.

Magnetic recording is an old art but did not become commercially significant until World War II. Although the device has many applications, the principal use of concern in this litigation has been in computers.

IV. The Duinker Patent

The Duinker patent, issued March 6, 1962 on an application filed September 11, 1956, concerns a magnetic recording head having a core formed of sintered ferro-magnetic oxide material, or ferrite,¹ with a glass filled gap. The patent addresses itself to the problem of chipping of the gap edges in heads composed of ferrite. It teaches that if the coefficients of expansion (hereinafter "CTE's")² of the glass and ferrite are matched to a degree closer than that necessary merely to assure a good bond, chipping of the ferrite edges in use will be eliminated.

The patent contains four claims each of which is asserted by plaintiff as infringed by defendants' products.

1. Ferrites are non-metal magnetic materials composed of zinc oxide, iron oxide, etc., mixed in powdered form and compressed and heated at high temperatures so that the separate particles fuse to form one solid body.

2. Sometimes referred to as the coefficient of thermal expansion, this term refers to the expansibility of a material upon change in temperature, measured as the change in length for a given temperature change divided by the total length.

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These claims are set out in full in the margin.³ The first and second claims differ only in that the former indicates the CTE's of the ferrite core and the glass gap-filler are substantially equal at the temperature of use whereas the latter indicates the CTE's are substantially equal in the entire temperature range from the temperature of use to the softening point of the glass. The third and fourth claims add to the first and second a glass fillet, a small additional portion of glass within the loop formed by the ferrite parts.

3. The claims of the Duinker patent are:

1. An annular magnetic recorder head for recording or reproducing magnetic recordings comprising at least two circuit parts of sintered ferromagnetic oxide material with an effective gap between said circuit parts, said gap being filled entirely with a glass material mechanically joining and bonding to each other said circuit parts, said glass material being the sole bonding agent between said circuit parts, said glass material having a coefficient of expansion substantially equal to the coefficient of expansion of said sintered ferromagnetic oxide material at the temperature at which the magnetic recorder head is used.

2. An annular magnetic recorder head for recording or reproducing magnetic recordings comprising at least two circuit parts of sintered ferromagnetic oxide material with an effective gap between said circuit parts, said gap being filled entirely with a glass material mechanically joining and bonding to each other said circuit parts, said glass material being the sole bonding agent between said circuit parts, said glass material having a softening temperature, said glass material also having a coefficient of expansion substantially equal to the coefficient of expansion of said sintered ferromagnetic oxide material throughout the entire temperature range lying between the temperature at which the magnetic recorder head is used and the temperature at which the glass begins to soften.

3. An annular magnetic recorder head for recording or reproducing magnetic recordings comprising at least two circuit parts of sintered ferromagnetic oxide material having inner and outer surfaces with an effective gap between said circuit parts,

(footnote continued on next page)

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Defendant Micronetics has admitted that its products contain every feature of the claims with the exception of the matched CTE's. Inasmuch as the equality of the CTE's is a limitation of each claim, defendants assert they do not infringe. Additionally, they assert that the patent is invalid because the term "substantially equal" is indefinite and because matching of CTE's is obvious in view of the prior art.

A. *Infringement*

To determine whether an accused device infringes a patent, resort must be had to the claims. Infringement is

said gap being filled entirely with a glass material mechanically joining and bonding to each other said circuit parts, said glass material being the sole bonding agent between said circuit parts, said glass material and said circuit parts forming a closed annular space, part of said glass material extending into said space in contact with the inner surfaces of said ferromagnetic oxide material, said glass material having a coefficient of expansion substantially equal to the coefficient of expansion of said ferromagnetic oxide material at the temperature at which the magnetic recorder head is used.

4. An annular magnetic recorder head for recording or reproducing magnetic recordings comprising at least two circuit parts of sintered ferromagnetic oxide material having inner and outer surfaces with an effective gap between said circuit parts, said gap being filled entirely with a glass material mechanically joining and bonding to each other said circuit parts, said glass material being the sole bonding agent between said circuit parts, said glass material having a softening temperature, said glass material and said circuit parts forming a closed annular space, part of said glass material extending into said space in contact with the inner surfaces of said ferromagnetic oxide material, said glass material having a coefficient of expansion substantially equal to the coefficient of expansion of said ferromagnetic oxide material throughout the entire temperature range lying between the temperature at which the magnetic recorder is used and the temperature at which the glass begins to soften.

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made out when the accused product falls clearly within the claim. *Graver Tank & Mfg. Co. v. Linde Air Products Co.*, 339 U.S. 605, 607, 70 S.Ct. 854, 94 L.Ed. 1097 (1950).

Each of the claims specifies that the CTE's of the glass and the ferrite should be substantially equal. Turning to the Micronetics products, the following table indicates the CTE's of the glasses and ferrites at the temperature of use and the percentages by which they differ in different cores:

Part No.	Glass Type	Glass CTE	Ferrite Type	Ferrite CTE	% Diff.
35058	2109	7.4×10^{-6}	LM211	7.2×10^{-6}	2.7
30239	2107	7.4×10^{-6}	M211	7.3×10^{-6}	2.7
30152	1303	7.7×10^{-6}	M211	7.3×10^{-6}	5.5
30331	1303	7.7×10^{-6}	LM211	7.2×10^{-6}	6.5
30134, 30245, 30156	1303	7.7×10^{-6}	M210	7.1×10^{-6}	8.5
30005	1201	6.3×10^{-6}	M210	7.1×10^{-6}	11.3
30037	2205	6.0×10^{-6}	M210	7.1×10^{-6}	15.5
30085	2205	6.0×10^{-6}	M211	7.3×10^{-6}	17.8
30064	2104	5.1×10^{-6}	M211	7.3×10^{-6}	30.1

As can be seen, the variation in the CTE's ranges from 2.7% to 30.1%. Plaintiff asserts that all of these products infringe claim one with respect to the CTE limitation.

To determine whether Micronetics products infringe the patent, we must construe the limitation in the claims that the CTE's of the glass and ferrite be "substantially equal."

In order to construe this term, resort must be had to the specifications for it is axiomatic that claims are to be construed in light of the specifications. *United States v. Adams*, 383 U.S. 39, 49, 86 S.Ct. 708, 15 L.Ed.2d 572 (1966); *Schriber-Schroth Co. v. Cleveland Trust Co.*, 311 U.S. 211,

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217, 61 S.Ct. 235, 85 L.Ed. 132 (1940). The specifications contain the following description of the invention:

"When the coefficients of expansion are equal to one another at the temperature at which the magnetic recorder head is used (with a tolerance of 5%), the tensions occurring in the glass are small thus preventing the production of strains in the ferrite which would also tend to facilitate chipping of the ferrite edges of the gap by the mechanical forces exerted by the operation of the magnetic recording carrier; . . ."

The interpretation that must be placed on this language is that to practice the invention one must make the CTE's as equal as possible with a maximum allowable difference of 5%. The examples of suitable matches given by the inventor are all well within this 5% limit. Thus, the term substantially equal, as used in the claims, should be given the meaning "matched within 5%."

Turning to the accused devices, only two Micronetics heads fall clearly within the range claimed by the patent, parts numbered 35058 and 30239 and could be said to infringe.

Plaintiff argues that all the cores manufactured by Micronetics infringe under the doctrine of equivalents. Courts have recognized that infringement may be made out even though the accused device does not duplicate every literal detail of the patented invention. The test of infringement under the doctrine of equivalents is whether the device "performs substantially the same function in substantially the same way to obtain the same result." *Graver Tank & Mfg. Co. v. Linde Air Products Co.*, *supra*, 339 U.S. at 608, 70 S.Ct. at 856. The range of equivalents to

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be accorded a patent varies with the circumstances of the particular case. A primary, or pioneer, invention may be accorded a broad range of equivalents whereas an improvement patent is not entitled to such a broad range of protection. 4 A. Deller, *Deller's Walker on Patents*, §232, at 82-83 (2d ed. 1965). Basically, the inquiry is whether the inventive principle has been appropriated and the changes made insubstantial.

The sole claimed invention in Duinker is the discovery that ferrite gap edge-chipping may be avoided by matching the CTE's of the glass and ferrite within a tolerance of 5% at the temperature of use and 10% over the range from room temperature to the softening point of the glass. The prior art concerning magnetic recording heads is crowded and the claimed invention is narrow. To construe the range of equivalents to be accorded the Duinker patent to embrace all of the Micronetics cores would render the term "substantially equal" meaningless and would have the effect of reading it out of the patent altogether. This term is an express limitation pertaining to the inventive step and implies, in effect, that anything beyond the limitation will not produce equivalent results. Inasmuch as the inventor has declared combinations, such as those found in the accused devices, not equivalent, we cannot treat them otherwise to find infringement. See *Dow Chemical Co. v. Skinner*, 197 F.2d 807, 810 (6th Cir.), cert. denied, 344 U.S. 856, 73 S.Ct. 94, 97 L.Ed. 664 (1952); *Preformed Line Products Co. v. Fanner Manufacturing Co.*, 225 F.Supp. 762, 774 (N.D. Ohio 1962), aff'd, 328 F.2d 265 (6th Cir.), cert. denied, 379 U.S. 846, 85 S.Ct. 56, 13 L.Ed.2d 51 (1964).

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Nor can a change in the match of the CTE's be considered an insubstantial alteration in the practice of the invention. The whole inventive principle in the patent lies in the match of the CTE's. When the CTE's are not matched in the manner specified the inventive principle is not appropriated. Thus, although the accused devices accomplish the same result; that is, they are commercially acceptable cores free from undue chipping, they do so in a different manner. First, as plaintiff's expert testified, improvements in ferrites have to some extent reduced the chipping problem to which Duinker is directed. Second, Micronetics devices follow a different teaching. Micronetics cores are produced according to the principle that glass is strongest under compression and, thus, ferrite of a higher CTE than the glass is used. This is nowhere taught by Duinker.

Therefore, it cannot be said that all the Micronetics cores infringe plaintiff's patent under the doctrine of equivalents. The Court has examined plaintiff's other arguments in support of a finding of infringement and finds them to be without merit. Accordingly, the Court finds that only Micronetics parts numbered 35058 and 30239 infringe the Duinker patent.

B. Indefiniteness

Defendants argue that the Duinker patent is invalid because it lacks the definiteness of description required by 35 U.S.C. §112. They contend that the term "substantially equal," as used to describe the degree of CTE match, is vague and indefinite. Further, they contend that there is no such thing as a CTE at the temperature of use and that this

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meaningless relationship compounds the indefiniteness of the claims and specifications.

Although the statute requires an exact description of the invention, it does not require description in terms of exact measurement. All that is required is that the claims, when read in light of the specifications, inform those skilled in the art how to practice the invention and how infringement may be avoided. *Eibel Process Co. v. Minnesota & Ontario Paper Co.*, 261 U.S. 45, 65, 43 S.Ct. 322, 67 L.Ed. 523 (1923); *Georgia-Pacific Corp. v. United States Plywood Corp.*, 258 F.2d 124, 136 (2d Cir.), cert. denied, 358 U.S. 884, 79 S.Ct. 124, 3 L.Ed.2d 112 (1958). Whether a given claim has the requisite definiteness depends upon the facts in each case. *Georgia-Pacific Corp. v. United States Plywood Corp.*, *supra*.

Applying these standards to the facts of the instant case, the Court finds that the specifications and claims are sufficiently definite to meet the statutory standard of 35 U.S.C. §112. There are many instances where claims with adverbs such as "substantially" have been upheld against a challenge of indefiniteness. See, e. g., *Eibel Process Co. v. Minnesota & Ontario Paper Co.*, *supra*; *Borg-Warner Corp. v. Paragon Gear Works, Inc.*, 355 F.2d 400 (1st Cir. 1965), petition for cert. dismissed, 384 U.S. 935, 86 S.Ct. 1461, 16 L.Ed.2d 536 (1966); *Arnold Pipe Rentals Co. v. Engineering Enterprises, Inc.*, 350 F.2d 885 (5th Cir. 1965); *H. H. Robertson Co. v. Klauer Mfg. Co.*, 98 F.2d 150 (8th Cir. 1938). Thus, such terminology is certainly not indefinite as a matter of law.

Defendants rely on expert testimony, arguing that neither side's expert could precisely define what was meant

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by "substantially equal" as used in the claims. However, the Court does not view the testimony of either expert as persuasive on this particular point. Rather, the patent speaks for itself.

The Court finds that the term "substantially equal" as used in each claim of the patent is not so indefinite as to render the patent invalid.

Nor does the discussion of matching CTE's at the temperature of use, when added to the imprecision of the term "substantially equal" render the patent invalid under §112. The premise underlying Duinker's invention is that edge-chipping results from the heat generated by the movement of the recording head over the magnetic medium. Defendants' expert testified that the CTE at any given temperature was meaningless, that one needed a range between one temperature and another. Although the patent speaks of the "temperature of use," or room temperature, it is clear from the patent as a whole, particularly the examples given, that this refers to the range of temperature between 0°C and 40°C. Thus, the claims dealing with the CTE's of the glass and ferrite at the temperature of use are not meaningless.

C. Obviousness

The principal question raised with respect to the validity of the Duinker patent is whether the invention would have been obvious at the time it was made to a person having ordinary skill in the art. 35 U.S.C. §103. Resolution of the question requires application of the procedure set out in *Graham v. John Deere Co.*, 383 U.S. 1, 86 S.Ct. 684, 15 L.Ed.2d 545 (1966). That is:

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Under §103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. As indicia of obviousness or nonobviousness, these inquiries may have relevancy.

Id. at 17-18, 86 S.Ct. at 694.

The parties agree that this is the standard to be applied. They disagree, however, on what constitutes the pertinent prior art and on the conclusion this Court should reach in applying the agreed standard to the prior art.

1. *Scope and Content of the Prior Art*

Defendants cite as pertinent prior art U.S. Patent Nos. 2,071,196 to Burger et al.; 2,167,482 to Hull et al.; 2,371,627 to Kingston; an article by Chynoweth, dated August, 1955 and a German publication entitled "The Methods of Fusing Ceramics to Glass and Metal," dated 1942. They argue that these authorities fully disclose that which Duinker claimed as his invention. Plaintiff, on the other hand, contends that each of these authorities is merely concerned with achieving good bonding and that none discloses information which would make it obvious to one skilled in the art to match CTE's of the glass and ferrite to an extent closer than that needed to achieve good bonding in order to

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alleviate ferrite gap edge chipping. A closer examination of each of the cited items is necessary.

The Burger Patent

This patent, issued in 1937, concerns glass-to-metal-seals in general. It is directed at resolving the problem posed by failure of the seal in use, although a good seal may have been initially created. According to the patent, differences in the CTE's of the glass and metal introduce strains in the seal which result in fissures or cracks in the glass. In the language of the patent,

In the prior seals, the glass and metal members, even though they may have had substantially the same coefficients of expansion at room temperature, have had different thermal expansions at the different temperatures involved in the process of making the seals and these members have undergone individual expansions and contractions in size during the heating and cooling cycles. Consequently, such seals have involved strains introduced at the higher temperatures which were carried through to the lower temperatures. Even though these residual strains may not have been greater than the elastic limit or breaking strength of the glass, depending upon the amount and kind of metal employed, at the time the seal was made, there has always been the possibility that the seal might eventually fail due to aging of the glass and the reduction of its elastic limit over a period of time, and many failures may be attributed to this cause. In view of these considerations, it is evident that none of the seals of the prior art has been entirely free from strain over the whole temperature range between room temperature and the softening temperature of the glass.

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Even though this strain is not sufficient to produce cracks or fissures at the time the seal is made, the glass is weakened at the joint and the seal is much more liable to failure, when the tube is operated at elevated temperatures, or even when it is idle and at room temperature. It is apparent that when an electric discharge tube of which the seal constitutes a part of the envelope is heated during operation, the temperature reached may be one of those temperatures at which there is a substantial difference in the respective thermal expansion coefficients of the glass and metal. This difference of expansion may serve to accentuate the residual strain or perhaps introduce additional strains.

As a solution to the problem of strain in glass-to-metal seals, the patent discloses that the CTE's of the glass and metal should "substantially coincide" at room temperature and through the temperature range to the softening point of the glass. The patent discloses a metal alloy and a glass having this characteristic. The graph which illustrates the invention shows the CTE's of these materials as matched to a degree of equality even closer than that disclosed by Duinker.

The Hull Patent

This patent, issued in 1939, on an application filed in 1936, is for an improvement in the glass-to-metal seal disclosed by Burger. It discloses new metal alloys and glasses which when combined in a seal will have "substantially corresponding" CTE's. The CTE graphs which illustrate the invention show a CTE match approaching identity and closer than that disclosed by Duinker.

*Appendix B**The Kingston Patent*

Issued in 1945, on an application filed in 1939, this patent relates to metal alloys and glasses for use in forming vacuum tight seals over long periods and over a wide temperature range. It likewise discloses the importance of matching the CTE's of the glass and metal up to the softening point of the glass.

The Chynoweth Article

Entitled "Ferrite Heads for Recording in the Megacycle Range," this article appeared in the August, 1955 issue of *Tele-Tech & Electronic Industries*. The article reports on research conducted with ferrite recording heads. Specifically, it concerns the wearing quality of ferrite heads with short gap lengths used in contact with a magnetic medium. According to the article, the gap edges chipped in use and this poor wearing quality represented a serious deficiency in ferrite heads. The article then discloses that:

A technique which holds some promise, [for decreasing this gap edge erosion] is to fill in the gap with a glaze material which is non-magnetic, bonds well to the gap faces and is hard.

According to the article such a head was constructed and the glazing technique was successful in increasing the head's resistance to wear.

The German Article

This article, concerning the methods of fusing ceramics to glass and metal, appeared in the German publication

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Keramische Rundschau in 1942. The article discloses that when bonding glass and ceramic, "no stresses will exist between the two materials only if the expansion curves have exactly the same course." Since this ideal is not practically attainable, the author suggests using a ceramic with a higher CTE than the glass.

2. Differences Between the Prior Art and the Claimed Invention

From the above recitation, it is apparent that all the individual elements claimed in the Duinker patent are shown by the prior art. However, no single item of the prior art shows the whole Duinker invention.

Defendants contend that the German article when read with the Chynoweth article fully discloses the Duinker invention. Plaintiff argues, on the other hand, that the German article was published before the development of ferrites and, thus, does not apply to ferrites. Further, plaintiff argues that Chynoweth does not disclose a gap completely filled with glass but merely glazed gap surfaces. Above all, plaintiff argues that none of the prior art references discloses that ferrite head edge-chipping is caused by unequal CTE's and that the solution lies in matching the CTE's to a degree closer than that necessary to attain a good bond.

Comparing the prior art with the claimed invention, as the Court must, the Court finds the following differences between the Duinker patent and the prior art: The patents to Burger, Hull, and Kingston disclose the importance of matching CTE's very closely to obtain strain-free glass-to-metal bonds. However, none of these patents deal with

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ferrites. Although they disclose that failure of the bond will result from use, if CTE's are not matched to substantial equality, in practical application the failure results in cracking of the glass in glass-to-metal bonds. Thus, they do not read exactly on the problem faced by Duinker.

The German article is concerned with bonding glass to ceramics, generally. It discloses that ideally CTE's should be equally matched to achieve a good bond. It is true that the article was written prior to the development of ferrites; however, it is undisputed that ferrite is a ceramic. Given this agreed fact and the article's concern with ceramics in general, the German article reads directly on the Duinker invention insofar as it indicates the desirability of matching CTE's in glass-to-ceramic bonds. It does not, however, disclose the more particular application of this principle claimed by Duinker.

The Chynoweth article does disclose glazing in the gap as a solution for improving the wearing problems in ferrite core gap edges. It is silent, however, on the CTE's of the materials used.

Plaintiff seeks to make much of these differences. As noted above, no one item of prior art fully discloses the Duinker invention. However, the proper standard to be applied is not whether the prior art fully discloses the precise invention claimed, but rather whether, in light of this prior art, the claimed Duinker invention would be obvious to one skilled in the art. *See, e. g., Koppers Co. v. S & S Corrugated Paper Machinery Co.*, 517 F.2d 1182 (2d Cir. 1975); *Julie Research Laboratories, Inc. v. Guild-line Instruments, Inc.*, 501 F.2d 1131 (2d Cir. 1974); *Formal*

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Fashions, Inc. v. Braiman Bows, Inc., 369 F.2d 536 (2d Cir. 1966).

Applying this standard to the facts of this case, the Court holds that the Duinker patent is invalid for obviousness in light of the prior art. First, Burger fully discloses that in glass-to-metal bonds failure occurs in use, even though a good bond is achieved in manufacture, if the CTE's of the glass and metal are not nearly equal, not only at room temperature but throughout the entire temperature range from room temperature through the softening point of the glass. Burger fully discloses that the heat generated in use elevates the temperature sufficiently to result in failure of the bond unless the CTE's are so matched. The prior art in making glass-to-metal bonds demonstrates that it was well known that CTE's should be closely matched to achieve good wearing qualities in use.

Plaintiff argues that the problems posed by glass-to-metal bonds are not analogous to those encountered by Duinker and these items should not be considered prior art. Plaintiff stresses that in glass-to-metal bonding the concern is with the glass whereas the glass is not a problem in bonding glass to ferrite.

Prior to the introduction of ferrites, magnetic recording heads were constructed of metal, often metal laminations. In the Duinker patent file wrapper, the Court finds at least one instance where glass was bonded to the metal pole pieces of such a metal head in order to join the two pole pieces. Thus, it appears that bonding glass to the metal heads was known in the magnetic recording head field.

Also, in light of the German article it would have been obvious that there were no significant differences with

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regard to the role of CTE's between ceramic-to-glass bonds and metal-to-glass bonds.

The patent examiner considered glass-to-metal bonds to be prior art in considering the patentability of the Duinker invention. The Court is constrained to likewise consider it. The only testimony presented at trial on the question is found in the conflicting opinions of the experts who testified on behalf of the respective parties. The Court is unpersuaded that the problem of ferrite gap edge chipping is completely different from the problem of glass breakage. Both are caused by strains in the bond. In glass-to-metal bonds the metal is not likely to crack or chip, therefore, it is the glass which suffers the effect of the strains. The inherent granularity of ferrite was well known and it seems obvious that the strains known to be in the bond would cause the ferrite to chip.

Thus, when one considers the disclosures of Burger together with the teaching of the German article, it would be obvious that making the CTE's substantially equal would alleviate chipping of the ferrite. When these references are read together with the Chynoweth article, the invention claimed by Duinker becomes an obvious solution to the problem of making ferrite cores for recording heads with good wearing qualities.

Plaintiff relies on the presumption of validity accorded a patent. In the Second Circuit the presumption of validity is weakened when the patent examiner did not consider all of the pertinent prior art. *See, e. g., Julie Research Laboratories, Inc. v. Guildline Instruments, Inc., supra; Formal Fashions, Inc. v. Braiman Bows, Inc., supra.* In the instant case, the patent examiner did not consider the

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Burger patent or, most important, the German article. Thus, the presumption of validity to be accorded the Duinker patent is considerably weakened.

In addition, plaintiff relies on the secondary considerations enunciated in *Graham v. John Deere Co.*, *supra* as indicia of the non-obviousness of the Duinker invention. Because of the danger of slipping into hindsight and reading into the prior art the teachings of the Duinker invention, the Court has considered the evidence of commercial success and long-felt but unsolved need. This inquiry has served only to reinforce the Court's judgment that the Duinker patent is obvious in view of the prior art.

First, plaintiff introduced no evidence of contemporaneous commercial success. The only evidence introduced relevant to this issue concerns the use at the time of the action of the Duinker invention by Ferroxcube Corporation, a wholly-owned subsidiary of North American Philips Corporation which manufactures glass bonded ferrite recording heads, and Micronetics. However, none of the cores produced by Ferroxcube utilize the Duinker invention, according to the Court's construction of the patent, and the majority of Micronetics' product, also, fall outside the invention.

Likewise, there is no evidence of any long-felt want. Ferrites were first introduced around 1950 and Duinker first filed for his patent in 1955. The evidence indicates that this was a crowded art with considerable activity during this period. The witnesses who testified painted a picture of a milieu where as soon as one group of researchers discovered a problem others set about solving it. *Cf.*, *Julie*

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Research Laboratories, Inc. v. Guildline Instruments, Inc., *supra*; *Indiana General Corp. v. Krystinel Corp.*, 421 F.2d 1023, 1030-31 (2d Cir.), *cert. denied*, 398 U.S. 928, 90 S.Ct. 1820, 26 L.Ed.2d 91 (1970).

In sum, the Court holds that the Duinker patent is invalid for obviousness in light of the prior art. There may be some novelty in the Duinker invention but novelty is insufficient to meet the non-obvious requirement of §103 when the novel element would have been obvious to a person skilled in the art. *See Lemelson v. Topper Corp.*, 450 F.2d 845 (2d Cir. 1971), *cert. denied*, 405 U.S. 989, 92 S.Ct. 1253, 31 L.Ed.2d 456 (1972).

Next, the Court turns to the Peloschek patent.

V. *The Peloschek Patent*

The Peloschek patent, issued April 19, 1966 on an application filed May 3, 1963, is directed to a process for manufacturing bonded magnetic recording heads of a kind described by Duinker. The patent addresses itself to the problems of manufacturing magnetic recording heads with very short gap lengths, simply, and achieving close gap length tolerances.⁴ The patent teaches that if the gap is pre-set by placing the two magnetic pole pieces in a confronting relationship with the interposition of a shim, or spacing member, equal to the desired gap length and the glass is placed adjacent to the pre-set gap and the assembly is heated, the glass will flow into the gap by capillary action

4. "Close tolerance" refers to the small degree of deviation from the desired gap length or the slight "margin of error." Inasmuch as the patent speaks of gap lengths of 1 to 20 microns, the acceptable deviation, or tolerance, is very slight.

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and fill it, thus, producing a core with the desired gap length.

The patent contains fifteen claims. With the exception of claims 7, 12 and 13, all are assertedly infringed by defendants. The claims in issue are set out in full in the margin.⁵ The several claims differ from each other only in minor respects. Claim 10 is the broadest claim and comprises a method whereby the two confronting circuit parts or pole pieces are separated by a space equal to the desired gap length, the non-magnetic material is placed adjacent to the gap, and the assembly is heated to the melting

5.

1. A method of manufacturing portions of magnetic heads composed of two magnetic circuit parts consisting of sintered oxidic ferromagnetic material and having confronting gap surfaces with a gap therebetween filled with a nonmagnetic material bonding the circuit parts together, comprising: placing spacing members having a thickness equal to the desired gap length at opposite ends of a first polished gap surface of one circuit part, placing a corresponding polished gap surface of a second circuit part on said spacing members in confronting relationship with said first surfaces, thereby forming a gap between said surfaces, placing a quantity of nonmagnetic material adjacent to the gap, said nonmagnetic material having a melting temperature below that of said ferromagnetic material, and heating the resulting assembly to the melting temperature of said nonmagnetic material, whereby said nonmagnetic material melts, fills the gap by capillary action, and bonds the circuit parts together.

2. A method according to claim 1, wherein said nonmagnetic material is glass.

3. A method according to claim 1, wherein said nonmagnetic material is enamel.

4. A method according to claim 1, wherein pressure is applied to the assembly during the heating step.

5. A method of manufacturing portions of magnetic heads composed of two circuit parts consisting of sintered oxidic ferro-

(footnote continued on next page)

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temperature of the glass so that the gap is filled by capillary action. Claim 1 differs from claim 10 only in that it recites that the unfilled gap is pre-fixed by the placing of a spacing member or shim between the confronting pole pieces. Claim 5 adds to claim 1 the step of thermally etching the circuit parts before they are placed in a confronting relationship. Claim 6 is like claim 1 with the addition that the finished assembly is cut perpendicularly to form a plurality of cores. The remaining claims variously recite that the non-magnetic material is either glass or enamel or that pressure is applied during heating.

Defendant Micronetics admits that its products contain every feature of the claims with the exception of the gap

magnetic material and having gap surfaces with a gap therebetween filled with a nonmagnetic material bonding the circuit parts together, comprising: heating the two circuit parts, cooling the two circuit parts, placing spacing members having a thickness equal to the desired gap length at opposite ends of the first polished gap surface of one circuit part, placing a corresponding polished gap surface of a second circuit part on said spacing members in confronting relationship with said first surface thereby forming a gap between said surfaces, placing a quantity of nonmagnetic material adjacent to the gap, said nonmagnetic material having a melting temperature below that of said ferromagnetic material, and heating the resulting assembly to the melting temperature of said nonmagnetic material, whereby said nonmagnetic material melts, fills the gap by capillary action, and bonds the circuit parts together.

6. A method of manufacturing portions of magnetic heads composed of two circuit parts consisting of sintered oxidic ferromagnetic material and having gap surfaces with a gap therebetween filled with a nonmagnetic material bonding the circuit parts together, comprising: placing spacing members having a thickness equal to the desired gap length at opposite ends of at least two polished gap surfaces of one circuit part, placing the corresponding polished gap surfaces of a second circuit part on said spacing members in confronting relationship with the gap

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space or spacer being equal to the desired gap length and the thermal etching step. Inasmuch as the equality of the shim and the desired gap length is a limitation of each claim, defendants assert they do not infringe. Additionally, they assert that the patent is invalid because the term "equal to" is indefinite and because the claimed invention is obvious in view of the prior art.

A. Indefiniteness

As with the Duinker patent, defendants argue that the Peloschek patent is invalid because it lacks the definiteness of description required by 35 U.S.C. §112. They contend

surfaces of said one circuit part thereby forming gaps between said surfaces, placing a quantity of nonmagnetic material adjacent to the gaps, said nonmagnetic material having a melting temperature below that of said ferromagnetic material, and heating the resulting assembly to the melting temperature of said nonmagnetic material, whereby said nonmagnetic material melts, fills the gaps by capillary action, and bonds the circuit parts together, cooling the assembly, and then cutting the assembly along mutually perpendicular axes to form a plurality of head portions.

* * *

8. A method according to claim 6, wherein said nonmagnetic material is glass.

9. A method according to claim 6, wherein said nonmagnetic material is enamel.

10. A method of manufacturing portions of magnetic heads composed of two circuit parts consisting of sintered oxidic ferromagnetic material and having confronting gap surfaces with a gap therebetween filled with a nonmagnetic material bonding the circuit parts together, comprising: placing a polished gap surface of one circuit part in confronting relationship with a corresponding polished gap surface of a second circuit part, said surfaces being separated by a gap equal to the desired gap length, placing a quantity of nonmagnetic material adjacent to the gap, said nonmagnetic material having a melting temperature below that

(footnote continued on next page)

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that the term "equal to" as used to describe the relationship between the spacer and the desired gap length is without ascertainable meaning.

The Court finds that the specifications and claims are sufficiently definite to meet the statutory standard. As

of said ferromagnetic material, and heating the resulting assembly to the melting temperature of said nonmagnetic material, whereby said nonmagnetic material melts, fills the gap by capillary action, and bonds the circuit parts together.

11. A method according to claim 10, wherein said nonmagnetic material is glass.

* * *

14. A method of manufacturing portions of magnetic heads composed of two circuit parts consisting of sintered oxidic ferromagnetic material and having confronting gap surfaces with a gap therebetween filled with a nonmagnetic material bonding the circuit parts together, comprising: heating the circuit parts, cooling the circuit parts, placing a polished gap surface of one circuit part in confronting relationship with a corresponding polished gap surface of another circuit part, said surfaces being separated by a gap equal to the desired gap length, placing a quantity of nonmagnetic material adjacent to the gap, said nonmagnetic material having a melting temperature below that of said ferromagnetic material, and heating the resulting assembly to the melting temperature of said nonmagnetic material, whereby said nonmagnetic material melts, fills the gap by capillary action, and bonds the circuit parts together.

15. A method of manufacturing portions of magnetic heads composed of two circuit parts consisting of sintered oxidic ferromagnetic material and having confronting gap surfaces with a gap therebetween filled with a nonmagnetic material bonding the circuit parts together, comprising: thermally etching the gap surfaces of the two circuit parts, placing a polished gap surface of one circuit part in confronting relationship with a corresponding polished gap surface of another circuit part, said surfaces being separated by a gap equal to the desired gap length, placing a quantity of nonmagnetic material adjacent to the gap, said nonmagnetic material having a melting temperature below that of said ferromagnetic material, and heating the resulting assembly to the melting temperature of said nonmagnetic material, whereby and bonds the circuit parts together.

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already noted, the gap dimensions are exceedingly small and absolute precision in measurement cannot always be achieved. Just as a certain tolerance is acceptable in terms of the final core, an equivalent tolerance should be permitted with regard to the shim. The claims, when read with the specifications more than adequately inform those skilled in the art how to practice the invention and how to avoid infringement.

B. Obviousness

As with the Duinker patent, the principal challenge raised by defendants to the validity of the Peloschek patent is that the invention would have been obvious at the time it was made to a person having ordinary skill in the art. Thus, it is necessary to examine the scope and content of the prior art and the differences between the prior art and the Peloschek claims.

1. Scope and Content of the Prior Art

Defendants cite as pertinent prior art U.S. Patent Nos. 2,500,748 to Grant; 3,024,318 to Duinker *et al.*; 3,029,505 to Reichenbaum; 3,094,772 to Duinker; 3,117,367 to Duinker *et al.*; 3,283,396 to Pfoest; 3,304,358 to De Jean *et al.*; 3,341,939 to Feinberg *et al.*; 3,065,571 to Hill; German patent 10546; and two German articles. Defendants contend that in light of this prior art the use of capillary action to manufacture glass bonded ferrite cores would have been obvious and represented merely routine engineering. Plaintiff, on the other hand, contends that all the cited prior art which is relevant to the problem points toward the non-

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obviousness of the patented invention and that none shows the capillary process in the recording head industry.

The Three Duinker Patents

Duinker '318 is the patent here in suit and discussed above. The method of manufacturing the invention disclosed by the patent consists of placing a glass foil which exceeds in size the ultimately desired gap width by a few percent between two confronting polished ferrite gap surfaces. This assembly is then heated to a temperature within the softening range of the glass and pressure is applied until the correct gap-width is reached. This can be referred to as the "sandwich" technique. Relevant, also, is a method of manufacturing the glass fillet consisting of placing a glass rod inside the ferrite loop near the gap so that during heating the glass spreads to form the fillet.

Duinker '722, issued June 25, 1963 on an application filed June 26, 1957, discloses merely a further refinement and expanded discussion of the manufacturing technique disclosed in the first Duinker patent. Additionally, it includes the disclosure of slicing the ferrite glass assembly to form a multiplicity of cores.

Duinker '367, issued January 14, 1964 on an application filed June 15, 1959, discloses a further refinement of the sandwich technique by the addition of shims or spacers, "the thickness of these spacers being substantially equal to the finally desired gap length." The description explains that the spacers were intended to alleviate the problem of glass flowing away in heads with a gap length of greater than 10 microns. The function of the spacers is to fix the

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gap length. They are placed at the ends of the sheet of glass and between the ferrite bars prior to the heating and compression steps and are then ground away after cooking.

The Pfost Patent

This patent, issued November 8, 1966 on an application filed April 17, 1961, exemplifies another variation of the sandwich technique. The method disclosed consists of depositing spacer strips on one ferrite surface and a thin layer of glass on the other ferrite surface, placing the two ferrite surfaces in a confronting relationship, and heating the assembly to a temperature of 550-900 degrees centigrade under high pressure. The patent, also, discloses heating the ferrite blocks to a temperature of 600 degrees centigrade prior to coating with either glass or spacer in order to remove contaminants. Of significance to this litigation is the disclosure in the specifications that at temperatures between 550-900 degrees centigrade, glass will wet the ferrite.

The Hill Patent

This patent, issued on November 27, 1962 on an application filed October 10, 1957, concerns a composite material of platinum alloy and glass for use in making glass-to-metal seals. The parties are in dispute as to what this patent discloses. Defendants contend that the patent discloses that capillary action is a customary method for bonding glass and metal. Plaintiff argues capillarity is discussed in general terms. The Court finds that capillary action is discussed in general terms as the physical principle which is the foundation for the invention. The patent

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discloses that glass is a liquid and will behave as a liquid insofar as capillary action is concerned. Thus, in order to achieve a good glass-to-metal bond, the patent claims an alloy which exhibits superior wetting action.

Prior Art Processes Utilizing the Principle of Capillary Action

A group of defendants' prior art references may be conveniently categorized as illustrations of the use of capillary action in connection with manufacturing processes with materials other than glass and ferrite.

The patent to Reichenbaum, issued April 17, 1962 on an application filed September 29, 1958, falls into this category. It discloses the process of bonding a semiconductor to a metal base, a heat sink, by means of flowing solder between the two parts by capillary action. A small quantity of solder is placed adjacent to the empty space between the two materials and on melting flows into the space.

The patents to De Jean, Feinberg, and the German patent all disclose the process of manufacturing a laminated magnetic core by flowing non-magnetic resins into the minute space between the laminations by capillary action. The German patent, in particular, is for manufacturing metal laminated recording head cores.

The Grant patent, issued March 14, 1950 on an application filed November 21, 1947, concerns a method for manufacturing magnetic structures consisting of two or more magnetizable members separated by a non-magnetic gap. According to the claims, the invention comprises:

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2. In a magnetic structure, a first magnetizable member provided with a mortise, a second magnetizable member having a projection thereon forming a tenon, said two magnetizable members being interfitted to form a mortise and tenon joint, a washer of low melting point non-magnetizable material brazed between said members adjacent said joint, and a capillary film of said non-magnetizable material brazed between contiguous surfaces of said mortise and tenon, thereby rigidly to connect said magnetizable members together and to form therebetween a permanent non-magnetic gap of fixed dimensions.

In plain English, the patent discloses a structure consisting of two magnetic parts separated by a minute permanent non-magnetic gap, which also bonds the two together, created by flowing non-magnetic material between the two parts by capillary action.

2. *Differences Between the Prior Art and the Claimed Invention*

From the preceding recitation, it is apparent that no one item of prior art discloses the whole of the Peloschek process. Defendants contend, however, that the use of capillary action to fill spaces was well known and that it was an obvious solution to the problem of filling the non-magnetic gap in ferrite recording head cores. They contend that when the prior art disclosures concerning capillary action are read together with the disclosures of the Duinker patents, Peloschek results.

The most apparent difference from the Duinker patents process is that Duinker uses pressure to fill the gap rather than capillary action. Consequently, Duinker places the glass inside the gap rather than adjacent to it. However,

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Duinker does disclose the use of shims to determine the final gap length. Plaintiff makes much of the difference it perceives between the use of the shims in connection with setting the gap prior to the introduction of the glass in Peloschek and the use of the shims to keep the ferrite slabs apart during compression in Duinker. The Court finds this to be a difference without substance. In both patents the shims are equal or substantially equal to the ultimately desired gap length, they are placed between the two ferrite pieces to keep them a fixed distance apart.

Duinker, also, discloses that glass will wet ferrite. If one looks at the diagram in Duinker '772, one can clearly see the meniscus formed by the glass fillet. Wetting action of this sort is necessary for capillary action and the degree of surface tension as indicated by the meniscus and the wetting angle formed by the meniscus are crucial variables in determining the extent of capillary flow.⁶

The Pfof patent, so far as is relevant here, does not materially differ from the Duinker process. It, also, uses pressure to fill the gap with glass and spacers to determine the gap length. It does not speak to the use of capillary action to fill the gap, except that it notes that glass will wet ferrite at temperatures ranging from 550-900 degrees centigrade. It discloses a preliminary step of heating the ferrite to a temperature of 600 degrees solely to eliminate contaminants. However, this step cannot be equated with the thermal etching step at significantly higher temperature disclosed by Peloschek.

6. The formula for determining the extent of capillary flow is:

$$h = \frac{2T \cos \phi}{r.p}$$

where T = surface tension; ϕ = wetting angle; r = $\frac{1}{2}$ the width of the channel; and p = the density of the liquid.

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The Hill patent does not speak to a process of manufacturing magnetic recording heads. The only relevance it has to this litigation is its disclosure that glass is a liquid and will behave in accordance with the principles of capillary action.

The capillary action prior art, De Jean, Feinberg, and the German patent, differ from the Peloschek invention in that in each the precision and reproducibility of the gap length is not critical. Rather, the spaces to be filled are random. The substance of the Peloschek invention, in contrast, is directed at attaining reproducible minute gaps within close tolerances.

The claims of the Grant patent seem to read most directly on the Peloschek method. The two distinguishing features are the circular configuration of the magnetic members and the apparent irrelevance of the size of the gap. Although in Grant the space between the magnetic members is fixed in size at the conclusion of the process, there is no attempt to attain a predetermined gap size.

Thus, it is apparent that none of the prior art shows all the elements of the Peloschek process. The differences between the Duinker "sandwich" process and the Peloschek process are that the glass is moved from inside the gap to just adjacent to it and that instead of only one ferrite face being in contact with the shims both are. In the former, pressure is used to force the glass to fill the gap whereas in the latter capillary action does the job. The prior art indicates the widespread use of capillary action to fill minute gaps but in none is the precise size of the gap of great importance or predetermined. The question, how-

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ever, is not whether the precise invention is disclosed by the prior art, for then there would be novelty, but rather whether in light of the prior art the invention as a whole would be obvious to one skilled in the art. *Graham v. John Deere & Co., supra*; *Koppers Co., Inc. v. S & S Corrugated Paper Machinery Co., supra*; *Julie Research Laboratories, Inc. v. Guildline Instruments, Inc., supra*; *Formal Fashions, Inc. v. Braiman Bows, Inc., supra*.

In order to apply this standard, the level of skill in the pertinent art must be ascertained. Plaintiff contends that the pertinent art is that of magnetic recording, particularly ferrite recording heads. Defendants, on the other hand, contend that the pertinent art is the glass or glass and ceramic bonding technology. The Court finds that the pertinent art is the glass and glass bonding art. The problem to which the Peloschek patent is directed is that of manufacturing rather than high frequency recording technology. The problems posed by developing an economical method of manufacture were mechanical problems of working with glass and bonding glass to ferrite. Recording head efficiency and design were not the immediate concern of the Peloschek patent and the patent contains no disclosures directed toward improving ferrite recording head efficiency and design. Accordingly, the most pertinent art to the problem posed is that of glass bonding technology.

Although the question is a close one, the Court holds that the Peloschek invention would not have been obvious to one skilled in the art at the time it was made. The crucial feature, in the Court's view, is the use of capillary action to fill a preset gap of precise, reproducible dimensions. Nowhere in the prior art references cited to the Court is there

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any disclosure which would make it clear to one skilled in the art that such an application of capillary action would be successful. All of the prior art references disclose the use of capillary action to fill random voids. In none were the dimensions of the void of great importance. The mechanical skill of the calling consists, then, in using capillary action to fill voids the precise dimensions of which are unimportant. Inasmuch as the primary concern of the Peloschek invention is filling a gap whose precise dimensions are significant, it cannot be said that Peloschek is obvious within the standard of 35 U.S.C. §103.

Defendants had the burden of establishing their defense of patent invalidity for obviousness. After reviewing all the evidence, the Court concludes they have failed to sustain their burden. It is easy to argue, as defendants do, with the always perfect vision of hindsight that the Peloschek invention is fully anticipated by the prior art. For example, once one concludes that capillary action, as disclosed by Grant, can be successfully applied, it is obvious to take Duinker and merely move the glass outside the gap and place the ferrite pole pieces in a confronting relationship.

However, the fact remains that the prior art does not suggest that capillary action would successfully produce gaps of precise predetermined size with reproducibility. Indeed, the Grant patent was issued in 1950 and presumably this prior art was available to Duinker and the others who sought a method for manufacturing ferrite recording heads. Nonetheless, approximately seven years passed from the filing of Duinker's original patent application to the filing of Peloschek's patent application. During that period, the record discloses four patents for manufacturing

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glass bonded ferrite recording heads: the two later Duinker patents and the Pfof patent discussed above and a patent to M. Camras, U.S. Patent No. 3,079,470 filed December 21, 1959 and issued February 26, 1963, cited by the patent examiner.⁷ Each of these patents utilizes the "sandwich" process of introducing the glass into the gap by pressure. None suggests employing capillary action. Thus, as simple as the invention now appears, the Court cannot conclude that it was obvious to persons skilled in the art when the record discloses that these others endeavored during the seven year period to solve the problem unsuccessfully. As the court in *Timely Products Corp. v. Stanley Arron*, 523 F.2d 288, 294 (2d Cir. 1975) said:

We can conceive of no better way to determine whether an invention would have been obvious to persons of ordinary skill in the art at the time than to see what such persons actually did or failed to do when they were confronted with the problem in the course of their work. If the evidence shows that a number of skilled technicians actually attempted, over a substantial period, to solve the specific problem which the invention overcame and failed to do so, notwithstanding the availability of all the necessary materials, it is dif-

7. In addition, plaintiff introduced two patents, cited by neither the patent examiner nor the defendants, concerning methods of manufacturing ferrite recording heads. Patent No. 3,217,305 to Hanson, issued November 19, 1965 on an application filed July 19, 1962, discloses a slight variation of the sandwich process consisting of grooving the ferrite faces. Patent No. 3,188,400 to Vilensky, issued June 18, 1965 on an application filed January 9, 1961, discloses a different manufacturing method. It teaches the coating of the ferrite faces with a glass and ferrite compound and, then, heating to fuse the two separate pieces. Including plaintiff's cited prior art, there are in fact 6 different patents in the trial record concerning ferrite head manufacture prior to the Peloschek patent.

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ficult to see how a court could conclude that the invention was "obvious" to such persons at the time.

Admittedly, the evidence of the "secondary" indicia of non-obviousness is meager. Plaintiff presented some evidence which would tend to indicate that the Peloschek process has enjoyed a degree of contemporaneous commercial success. For example, as will appear more fully below, both Micronetics and Ferroxcube use the capillary process. N. V. Philips, whose employees developed the invention, also, makes some use of the process. There is, also, some testimony indicating that IBM made use of the process at least until 1969. In light of the record, the Court has not attached great weight to the proof offered of commercial success. Nonetheless, the failure of other skilled workers in the field has persuaded the Court to resolve any lingering doubt in favor of upholding the validity of the patent.

Accordingly, the Court holds that the Peloschek patent is valid and non-obvious under §103.

C. Infringement

As with the Duinker patent, the Court must look to the claims of the Peloschek patent and determine whether the Micronetics process falls clearly within the claims in order to decide whether Micronetics infringes the patent. *Graver Tank & Mfg. Co. v. Linde Air Products Co.*, *supra*, 339 U.S. at 607, 70 S.Ct. 854. Defendants contend only that the Micronetics process does not include the thermal etching step and shims "equal to" the desired gap length.

Each of the claims recites that the spacing members "are equal to" the desired gap length. Turning to the

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Micronetics products, the following table indicates the relationship between the shim heights and the gap length desired by the customer for the various Micronetics part numbers:

A	B	C	D	E
Shim Height	Desired Gap Length	Illustrative Part No.	Illustrative Bonded Bar No.	I-Bar No.
.0029"-.003"	.0024"-.0036"	30134	30162	
114-118u" ⁸	80-115u"	30093	30104	40003 ⁹
114-118u"	80-120u"	30316	30104	40003
114-118u"	85-115u"	30037	30104	40003
114-118u"	95-120u"	30041	30104	40003
114-118u"	90-120u"	30005	30101	40003
115-117u"	85-115u"	30023	30107	40017
115-117u"	90-110u"	30064	30107	40017
115-117u"	90-120u"	30060	30103	40025
158-164u"	130-160u"	30280	30182	40074
542-562u"	450-550u"	30245	30309	40086
(Write Gap)				
147-157u"	100-150u"	30245	30309	40086
(Read Gap)				
500-560u"	400-600u"	30156	30155	40037
60-64u"	45-65u"	35012	35021	45014 (C-Bar)

Column B in the table represents the gap length desired by the customer. As can be seen, all of the specified customer gap lengths are given as a range. Precision of measurement at these minute dimensions is not possible. Thus, there is always a certain tolerance, or permissible deviation, from any precise numerical value. As can be seen from Column A, all the Micronetics products fall within the specified range or outside the range by a few micro-inches. The only possible exception to this may be the "write gap"

8. The symbol u" as used in the table stands for micro-inches.

9. The shims are deposited on the I-bar ferrite piece.

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of part number 30245 in which the upper range of the shim height exceeds the upper range of the gap desired by 12 micro-inches. In light of the allowances which must be made for the imprecision of measurement, the shim height must be deemed equal to the desired gap length when it falls within the customer's specified range or outside the range by only a few micro-inches.

Defendants contend that the height of the shims exceeds the desired gap length and that the shims are compressed during the manufacturing process. Even if the Court could agree with this contention, which it does not, it would still be constrained to conclude that the Micronetics shims are equal to the desired gap because they fall within or close to the specified range. Accordingly, the Court holds that the Micronetics manufacturing process infringes claims 1 through 4, 6, and 8 through 11 of the Peloschek patent. Insofar as the "write gap" of part number 30245 may not be deemed as falling literally within or close to the desired gap length range, the Court holds that the deviation is so insubstantial as to be the equivalent of the Peloschek invention and thus infringes under the doctrine of equivalents. *Graver Tank & Mfg. Co. v. Linde Air Products Co., supra.*

Claims 5, 14 and 15 contain, as a further limitation, the preliminary step of thermally etching the ferrite bars prior to assembly. Thermal etching as used in the patent is the process whereby the ferrite bars are heated to a temperature of between 800 and 1000 degrees centigrade for a period of time and then allowed to cool producing ferrite grain boundaries which are visible with the assistance of the proper equipment. Defendants employ a preliminary "bake

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out" step for a combination of temperature and time which is less than that which produces visible grain boundaries. They contend that their "bake out" step is merely to remove contaminants and does not constitute thermal etching.

The Court finds that plaintiff has failed to sustain its burden of proof of infringement of those claims which include the thermal etching step. One of the co-inventors testified that thermal etching as used in the patent refers to producing visible ferrite grain boundaries. Photographs of Micronetics' ferrites after the "bake out" step were introduced into evidence and they do not exhibit the grain boundaries visible in thermally etched cores. Additionally, the Pfoest patent discloses a pre-heating step such as that performed by Micronetics for the purpose of removing contaminants. Accordingly, the Court concludes that the Micronetics process does not include the thermal etching step and that claims 5, 14 and 15 of the Peloschek patent are not infringed.

VI. Liability of Ned W. Buoymaster

Defendant Buoymaster is president of Micronetics and one of the four founders of the corporation. Plaintiff contends that Buoymaster actively induced the infringement of the two patents in suit and is personally liable as an infringer.

A corporate officer is generally not personally liable for an infringement when he acts solely within his duties as an officer and director. *Powder Power Tool Corp. v. Powder Actuated Tool Co.*, 230 F.2d 409, 414 (7th Cir. 1956); *Claude Neon Lights, Inc. v. American Neon Light Corp.*,

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39 F.2d 548 (2d Cir. 1930); *Upjohn Co. v. Italian Drugs Importing Co.*, 190 F.Supp. 361 (S.D.N.Y. 1961).

However, where a corporate officer exceeds his executive duties and deliberately organizes a corporation for the purpose of infringing a patent, or where he otherwise acts as the moving, active, conscious force behind an infringement, he may be held personally liable. *Upjohn Co. v. Italian Drugs Importing Co.*, *supra* at 367.

See also, *Marks v. Polaroid Corp.*, 237 F.2d 428, 435 (1st Cir. 1956).

Buoymaster founded Micronetics, along with three others, in April, 1969. The evidence establishes that the corporation was formed to produce materials, including ferrites, for use in highly technical electronics applications. There is no evidence to suggest that Micronetics was formed with the specific intent to manufacture glass-bonded ferrite recording heads. Nonetheless, soon after the formation of the corporation, it entered the market for glass-bonded ferrite cores.

Buoymaster is a large shareholder in Micronetics, although by no means a majority shareholder, and serves on the four man Board of Directors which manages the corporation.

Plaintiff has failed to sustain its burden of proving that Buoymaster acted in excess of his authority as an officer and director of Micronetics. The evidence shows only that Buoymaster was the chief administrative officer of the corporation. As such he was involved in the business aspects of corporate affairs and not in the technical produc-

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tion phase. He may have made the decision to offer for sale glass-bonded ferrite heads but he was familiar with the manufacturing process only in a general way. He in no way directed or instigated the infringing method of manufacture. Compare *Marks v. Polaroid*, *supra*; *Dean Rubber Mfg. Co. v. Killian*, 106 F.2d 316, 320 (8th Cir. 1939), *cert. denied*, 308 U.S. 624, 60 S.Ct. 380, 84 L.Ed. 521 (1940). There is no evidence to suggest that Buoymaster willfully participated in the infringement of plaintiff's patent. Accordingly, the Court holds that Buoymaster is not personally liable for infringement.

VII. Conclusion

In sum, plaintiff is entitled to judgment declaring Peloschek patent claims 1, 2, 3, 4, 6, 8, 9, 10 and 11 valid and infringed, and claims 5, 14 and 15 valid but not infringed. Additionally, plaintiff is entitled to a permanent injunction prohibiting infringement of the Peloschek patent. Defendants are entitled to a judgment declaring the Duinker patent invalid. The stay of the counterclaims is vacated and the parties are directed to proceed to the adjudication of the counterclaims and the issue of damages.

The foregoing constitutes the findings of fact and conclusions of law of the Court for the purposes of Rule 52, Fed.R.Civ.P.

Settle judgment on notice.

Appendix C

Section 8, Clause 8. Patents and Copyrights

To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries;

Appendix D

§103. Conditions for Patentability; Non-Obvious Subject Matter

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

Patentability shall not be negated by the manner in which the invention was made. July 19, 1952, c. 950, §1, 66 Stat. 798.

§112. Specification

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use

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the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof. July 19, 1952, c. 950, §1, 66 Stat. 798.